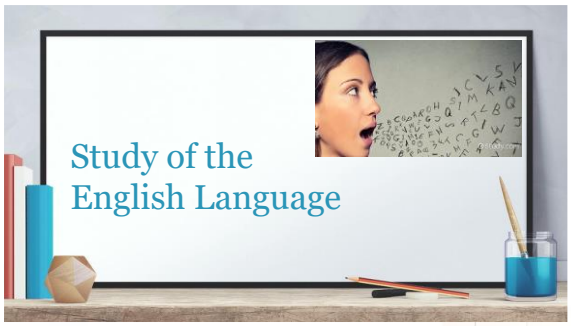
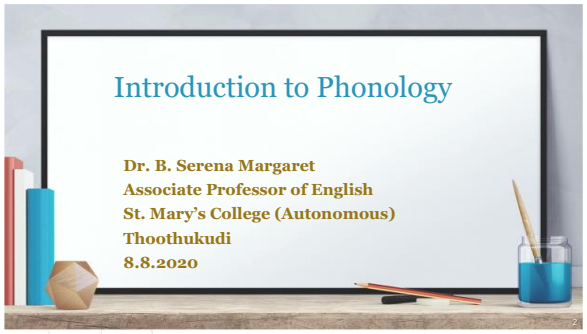
Criterion: II –Teaching, Learning and Evaluation

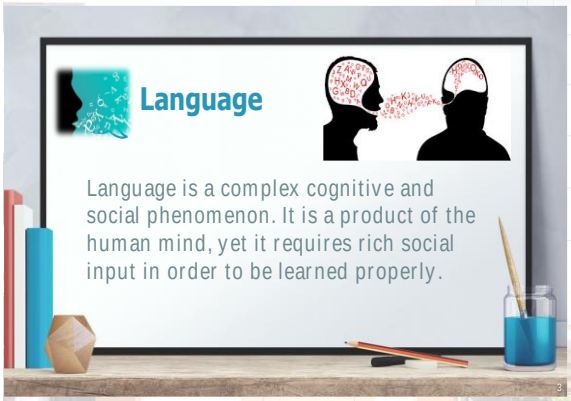
Metric: 2.2.1– Programmes for Slow Learners
Simplified Study Material
Year: 2018-2023

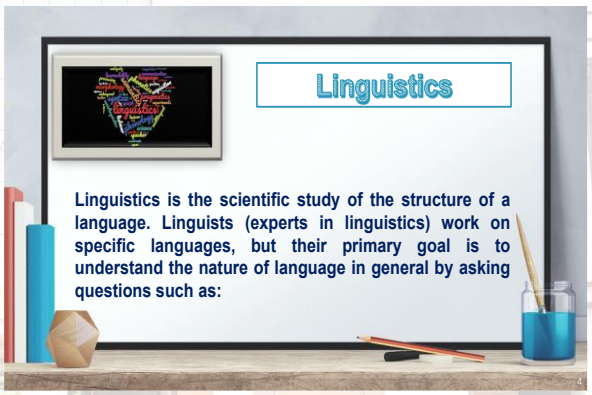
St. Mary's College strives to create inclusive learning environments that cater to the diverse needs of its students. To achieve this, it employs a variety of strategies to assess differential learning needs and implement targeted interventions for both the slow learners and the advanced learners. Differentiated instruction is a cornerstone for bridging the learning gap among students. By assessing students' learning levels through formative assessments and diagnostic tools, the institution identifies students who require additional support. Simplified Study Material also plays a critical role in enhancing student motivation and engagement. When educational content is tailored to their specific learning needs, students are more likely to remain engaged and motivated. For slow learners, personalised support and achievable goals foster a sense of competence and confidence, which are crucial for sustained academic effort.

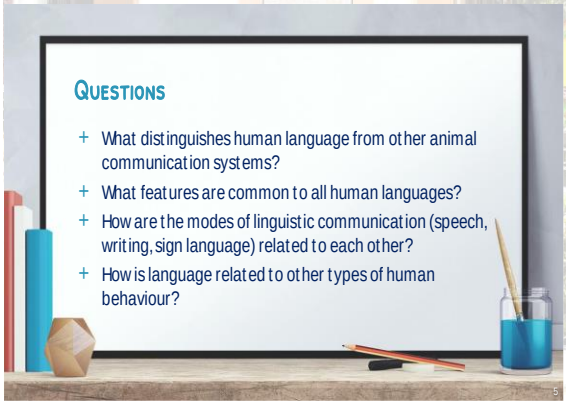
Principal
St. Mary's College (Autonomous)
Thoothukudi-628 001.

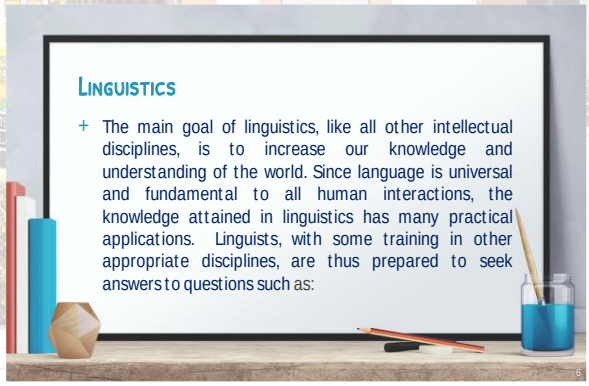

Study of the
English Language

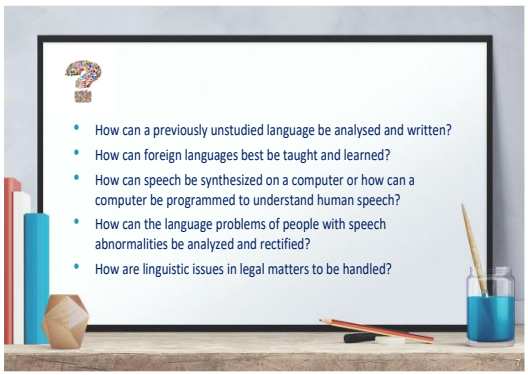

Introduction to Phonology
Dr. B. Serena Margaret
Associate Professor of English
St. Mary's College (Autonomous)
Thoothukudi
8.8.2020


Language
Language is a complex cognitive and social phenomenon. It is a product of the human mind, yet it requires rich social input in order to be learned properly.

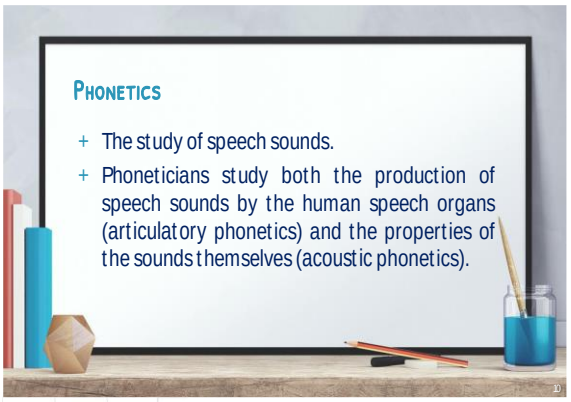

Linguistics
Linguistics is the scientific study of the structure of a language. Linguists (experts in linguistics) work on specific languages, but their primary goal is to understand the nature of language in general by asking questions such as:

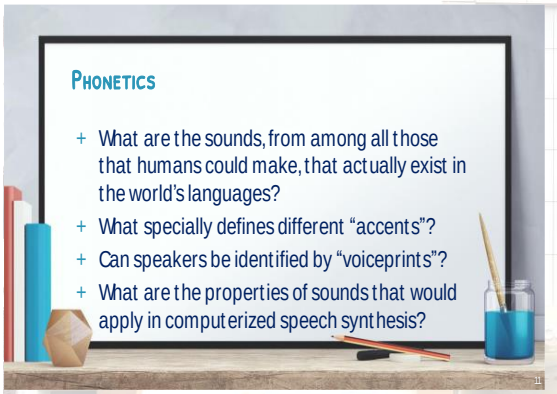

Questions
What distinguishes human language from other animal communication systems?
What features are common to all human languages?
How are the modes of linguistic communication (speech, writing, sign language) related to each other?
How is language related to other types of human behaviour?

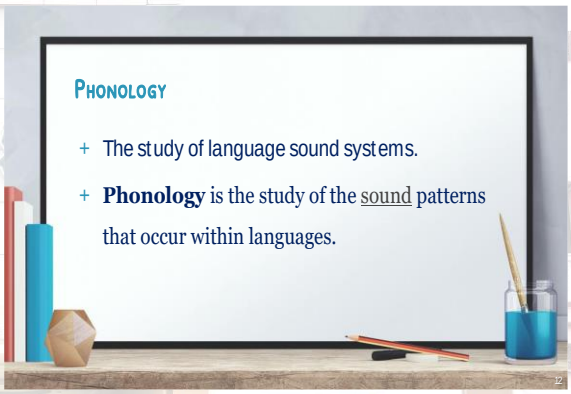

Linguistics
The main goal of linguistics, like all other intellectual disciplines, is to increase our knowledge and understanding of the world. Since language is universal and fundamental to all human interactions, the knowledge attained in linguistics has many practical applications. Linguists, with some training in other appropriate disciplines, are thus prepared to seek answers to questions such as:

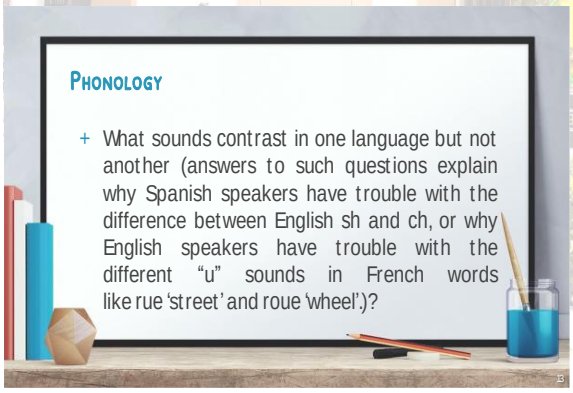

How can a previously unstudied language be analysed and written?
How can foreign languages best be taught and learned?
How can speech be synthesized on a computer or how can a computer be programmed to understand human speech?
How can the language problems of people with speech abnormalities be analyzed and rectified?
How are linguistic issues in legal matters to be handled?

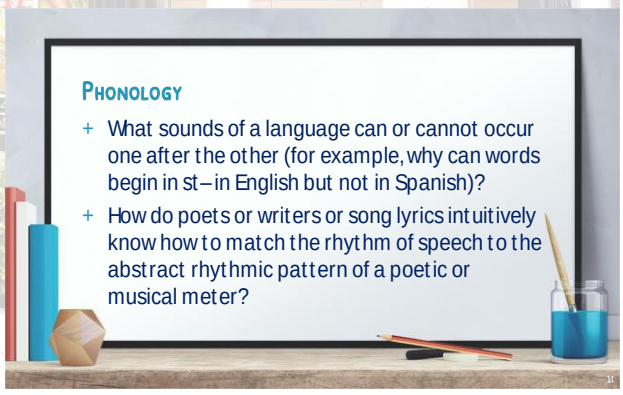

The Sub-Fields of Linguistics
+ Phonetics
+ Phonology
+ Morphology
+ Syntax
+ Semantics

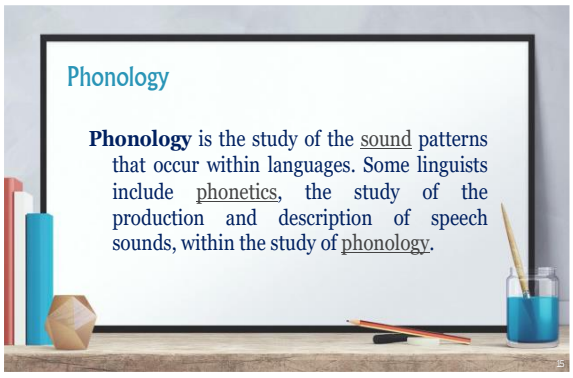

PHONETICS
+ The study of speech sounds.
+ Phoneticians study both the production of speech sounds by the human speech organs (articulatory phonetics) and the properties of the sounds themselves (acoustic phonetics).

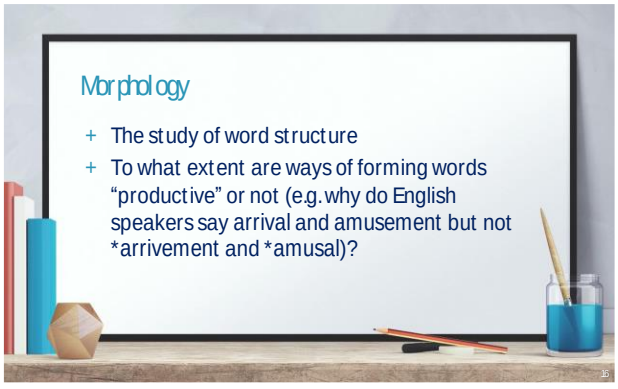

PHONETICS
+ What are the sounds, from among all those that humans could make, that actually exist in the world's languages?
+ What specially defines different "accents"?
+ Can speakers be identified by "voiceprints"?
+ What are the properties of sounds that would apply in computerized speech synthesis?

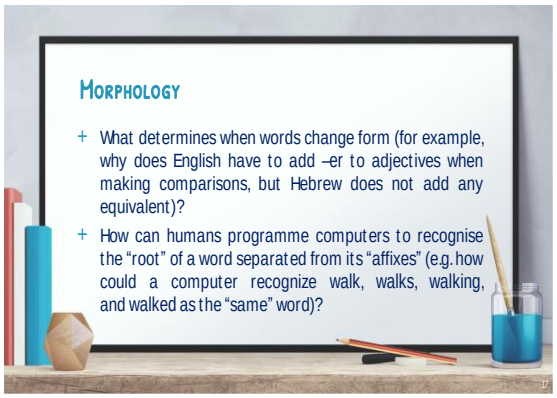

PHONOLOGY
+ The study of language sound systems.
+ **Phonology** is the study of the sound patterns that occur within languages.

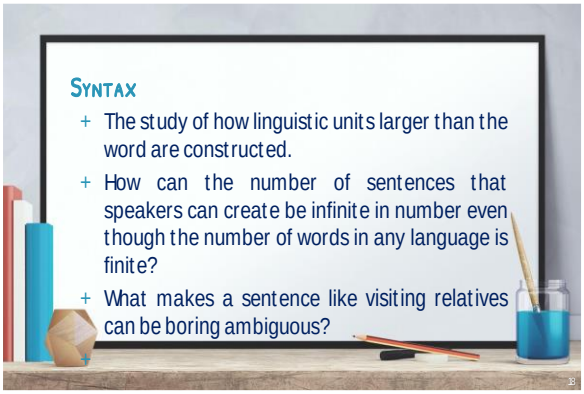

PHONOLOGY
+ What sounds contrast in one language but not another (answers to such questions explain why Spanish speakers have trouble with the difference between English sh and ch, or why English speakers have trouble with the different "u" sounds in French words like rue 'street' and roue 'wheel')?

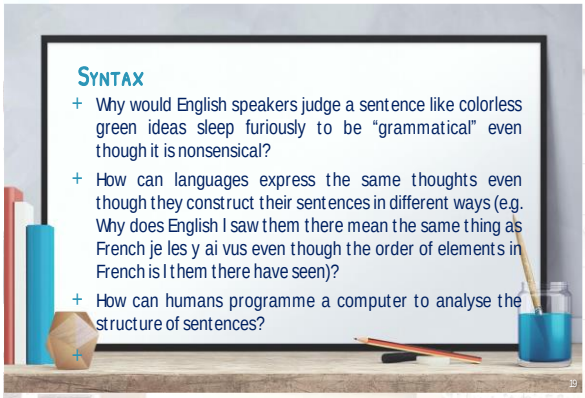

PHONOLOGY
+ What sounds of a language can or cannot occur one after the other (for example, why can words begin in st– in English but not in Spanish)?
+ How do poets or writers or song lyrics intuitively know how to match the rhythm of speech to the abstract rhythmic pattern of a poetic or musical meter?

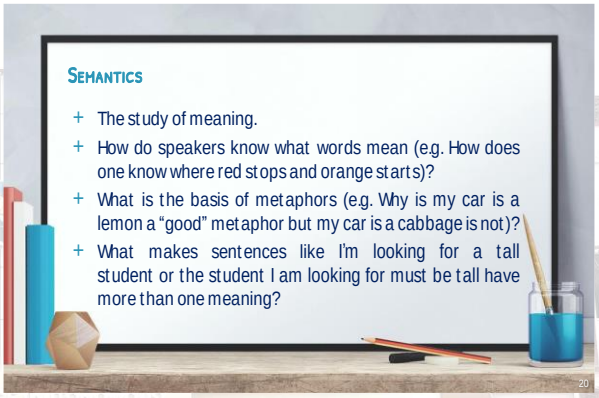

Phonology
Phonology is the study of the sound patterns that occur within languages. Some linguists include phonetics, the study of the production and description of speech sounds, within the study of phonology.

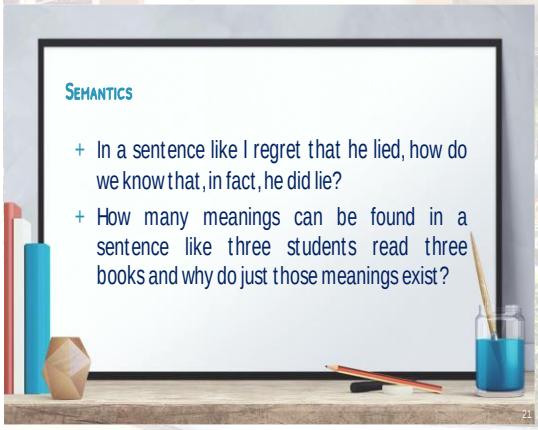

Morphology
+ The study of word structure
+ To what extent are ways of forming words "productive" or not (e.g. why do English speakers say arrival and amusement but not *arrivement and *amusal)?

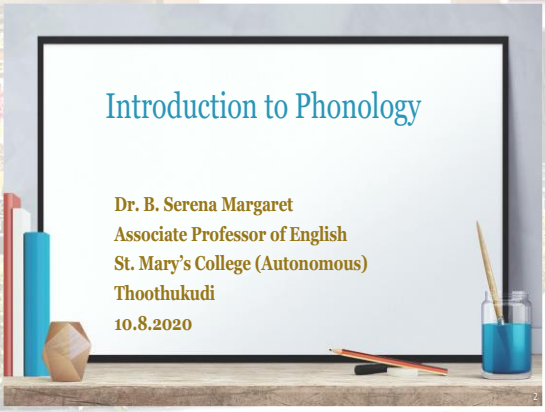

Morphology
What determines when words change form (for example, why does English have to add –er to adjectives when making comparisons, but Hebrew does not add any equivalent)?
How can humans programme computers to recognise the "root" of a word separated from its "affixes" (e.g. how could a computer recognize walk, walks, walking, and walked as the "same" word)?


Syntax
The study of how linguistic units larger than the word are constructed.
How can the number of sentences that speakers can create be infinite in number even though the number of words in any language is finite?
What makes a sentence like visiting relatives can be boring ambiguous?


Syntax
Why would English speakers judge a sentence like colorless green ideas sleep furiously to be "grammatical" even though it is nonsensical?
How can languages express the same thoughts even though they construct their sentences in different ways (e.g. Why does English I saw them there mean the same thing as French je les y ai vus even though the order of elements in French is I them there have seen)?
How can humans programme a computer to analyse the structure of sentences?


Semantics
The study of meaning.
How do speakers know what words mean (e.g. How does one know where red stops and orange starts)?
What is the basis of metaphors (e.g. Why is my car is a lemon a "good" metaphor but my car is a cabbage is not)?
What makes sentences like I'm looking for a tall student or the student I am looking for must be tall have more than one meaning?


Semantics
In a sentence like I regret that he lied, how do we know that, in fact, he did lie?
How many meanings can be found in a sentence like three students read three books and why do just those meanings exist?


Introduction to Phonology
Dr. B. Serena Margaret
Associate Professor of English
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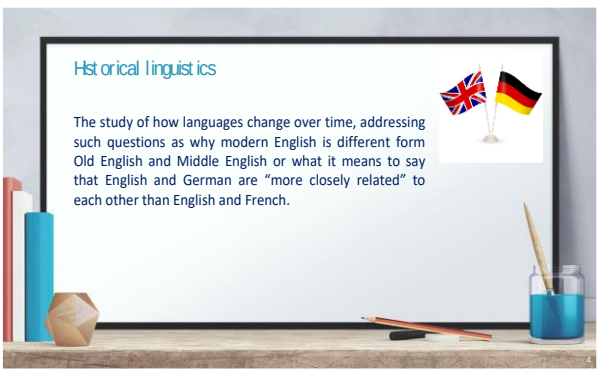
Thoothukudi
10.8.2020


Linguistics - SSPP
Syntax - Sentence Formation
Semantic – Sentence Interpretation
Phonetics – About Sounds of a Language
Phonology – About Sound Systems of a Language


Historical linguistics
The study of how languages change over time, addressing such questions as why modern English is different form Old English and Middle English or what it means to say that English and German are "more closely related" to each other than English and French.

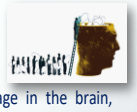
Sociolinguistics

- The study of how language is used in society, addressing such questions as what makes some dialects more "prestigious" than others, where slang comes from and why it arises, or what happens when two languages come together in "bilingual" communities.

Psycholinguistics

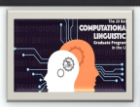
- The study of how language is processed in the mind, addressing such questions as how we can hear a string of language noises and make sense of them, how children can learn to speak and understand the language of their environment as quickly and effortlessly as they do, or how people with pathological language problems differ from people who have "normal" language

Neurolinguistics



- The study of the actual encoding of language in the brain, addressing such questions as what parts of the brain different aspects of language are stored in, how language is actually stored, what goes on physically in the brain when language is processed, or how the brain compensates when certain areas are damaged.

Computational linguistics



- Learning and understanding a language involves computing the properties of that language that are described in its phonology, syntax, and semantics. The challenge of describing this process connects linguistics with computational issues at a very fundamental level. How could syntactic structures be computed from spoken language, how are semantic relations recognized, and how could these computational skills be acquired?

Introduction to Phonemes

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Thoothukudi

13.8.2020

Phoneme

- **Phoneme**, in linguistics, is the smallest unit of speech distinguishing one word (or word element) from another, as the element *p* in "tap," which separates that word from "tab," "tag," and "tan."
- A phoneme may have more than one variant, called an allophone (*q.v.*), which functions as a single sound; for example, the *p*'s of "pat," "spat," and "tap" differ slightly phonetically, but that difference, determined by context, has no significance in English.

Phonemes

In some languages, where the variant sounds of *p* can change meaning, they are classified as separate phonemes—*e.g.*, in Thai the aspirated *p* (pronounced with an accompanying puff of air) and unaspirated *p* are distinguished one from the other.

Phonemes

Phonemes are based on spoken language and may be recorded with special symbols, such as those of the International Phonetic Alphabet.

In transcription, linguists conventionally place symbols for phonemes between slash marks: /p/.

Phoneme

•The term *phoneme* is usually restricted to vowels and consonants, but some linguists extend its application to cover phonologically relevant differences of pitch, stress, and rhythm.

•Pitch – The pitch of a sound is how high or low it is.

•Stress – emphasis placed upon a syllable by pronouncing it more loudly than those that surround it

•Rhythm - the arrangement of words into a more or less regular sequence of stressed and unstressed or long and short syllables

Phoneme

Nowadays the phoneme often has a less central place in phonological theory than it used to have, especially in American linguistics. Many linguists regard the phoneme as a set of simultaneous distinctive features rather than as an unanalyzable unit.

Phoneme

A phoneme is a single "unit" of sound that has meaning in any language. There are 44 phonemes in English (in the standard British model), each one representing a different sound a person can make. Since there are only 26 letters in the alphabet, sometimes letter combinations need to be used to make a phoneme. A letter can also represent different phonemes. Here is a good example:

chef = /ʃef/
choir = /kwaɪə/
cheese = /tʃi:z/

"ch" Phonemes

The "ch" letter combination has three different pronunciations, which are represented by three different phonemes: /ʃ/, /k/ and /tʃ/. Of course, this is confusing when you need to learn new words, but unfortunately, we are stuck with a strange spelling system in English. You really just need to learn the pronunciation of every new word, along with its meaning. Unlike other languages, English spelling is not phonetic.

Phonemes

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14.8.2020

PHONEMES

- A **phoneme** is the **smallest unit of sound** in a word.
- Knowing about phonemes is important for spelling.
- Phonemes - made up of **one or more letters** which make **one sound**.

Notice how the three phonemes ***sound*** the same.

Two new shoes

Spot the odd one out.

- Look carefully at the words below.
- Can you spot the phoneme that is **common** to each set?
- Which word **doesn't** share the common phoneme?

tree	feet	grew	sleep
rain	pain	mail	slap
know	seat	grow	show
Boat	away	play	stay

Phoneme Fallout.

- Some of the phonemes have fallen out of the words below.

Can you guess the missing phoneme ...

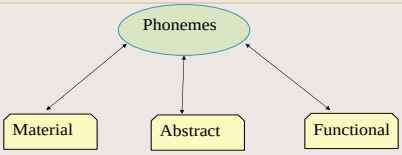
oo, ew or **ue**?

- S**oo**n thr**ew** cl**ue** r**oo**m
- Ch**ew** sch**oo**l cr**ue**l kn**ew**

Three Aspects

- The phoneme is a minimal abstract linguistic unit realised in speech in the form of speech sounds opposable to other phonemes of the same language to distinguish the meaning of morphemes and words. According to this definition the phoneme is a unity of three aspects: material, abstract and functional.

Three Aspects



Three Aspects

- Let us consider the phoneme from the point of view of its three aspects. Firstly, the phoneme is a functional unit. As you know, in phonetics function is usually understood as discriminatory function, i. e. the role of various components of the phonetic system of the language in distinguishing one morpheme from another, one word from another or also one utterance from another

Phonemes

- The opposition of phonemes in the same phonetic environment differentiates the meaning of morphemes and words:
- said – says
- sleeper – sleepy
- bath – path
- light – like

Phonemes

- Sometimes the opposition of the phonemes serves to distinguish the meaning of the whole phrases: he was heard badly – he was hurt badly. Thus we may say that the phoneme can fulfil the distinctive function.

Phoneme Vs Allophone

- The linguist uses two separate terms: "phoneme" is used to mean **"sound"** in its contrastive sense, and "allophone" is used for **sounds which are variants of a phoneme:** they usually occur in different positions in the word (i. e. in different environments) and hence cannot contrast with each other, nor be used to make meaningful distinctions.

Phonemes

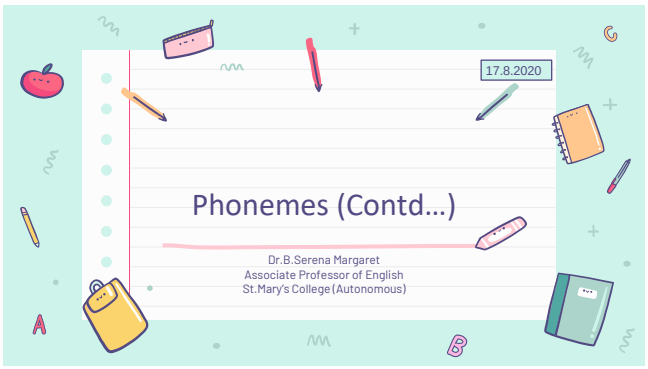
- Secondly, the phoneme is material, real and objective. That means that it is realised in speech of all English-speaking people in the form of speech sounds, its allophones.

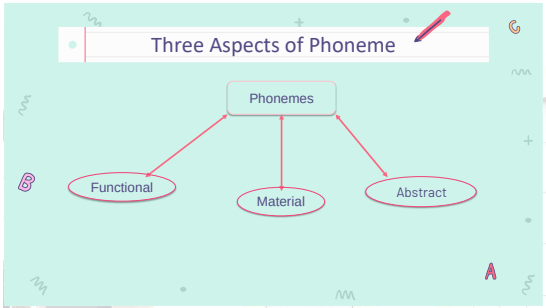
Allophones

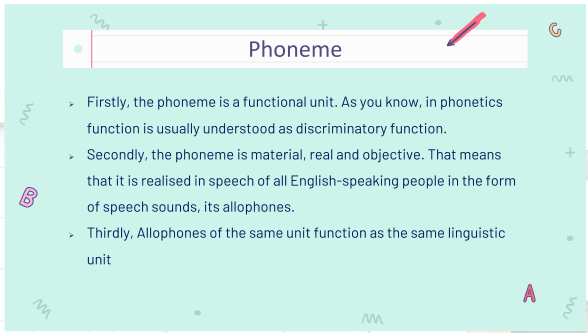
- The sets of speech sounds, i. e. the allophones belonging to the same phoneme:
- 1) are not identical in their articulatory content though there remains some phonetic similarity between them;
- 2) are never used in the same phonetic context

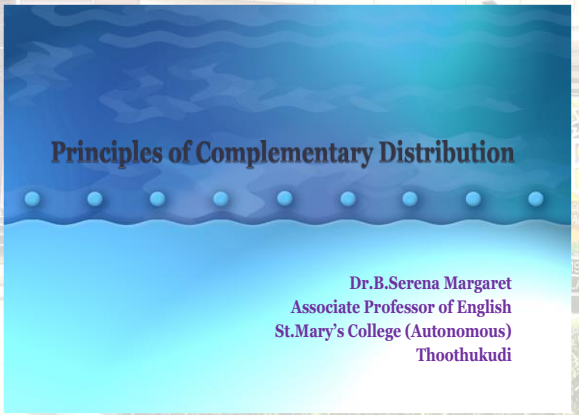
Allophones

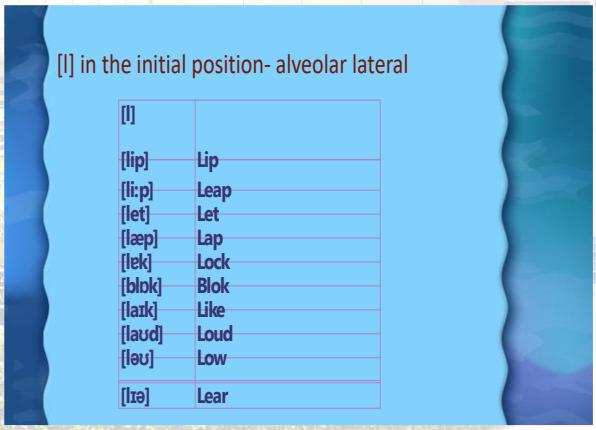
- For **example**, [pʰ] as in pin and [p] as in spin are **allophones** for the phoneme /p/ because they cannot distinguish words (in fact, they occur in complementary distribution). English-speakers treat them as the same sound, but they are different: the first is aspirated and the second is unaspirated (plain).

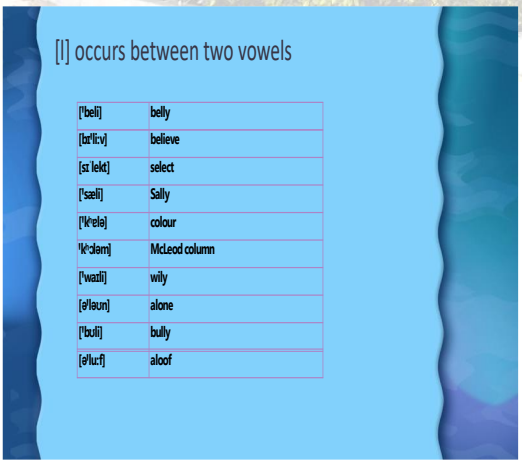


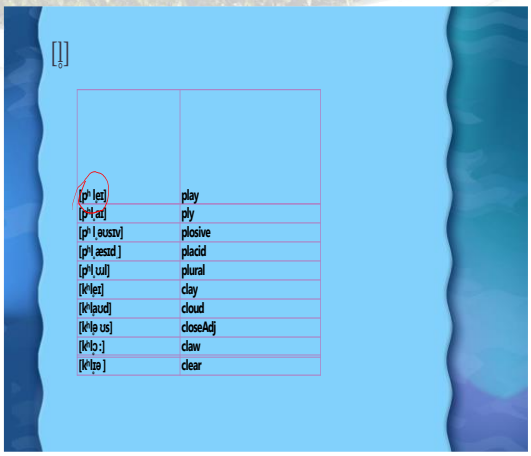


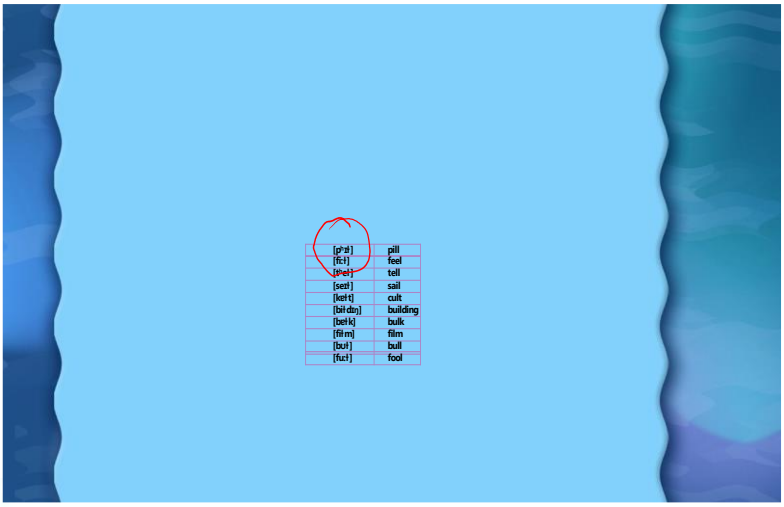


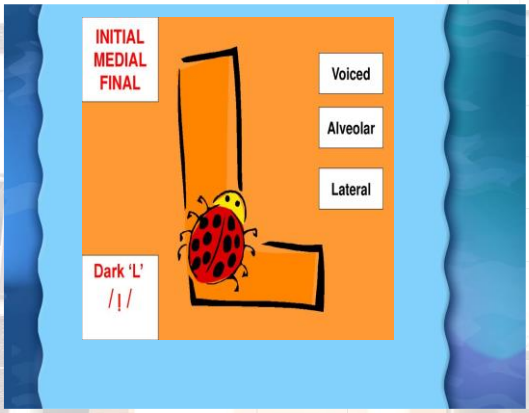


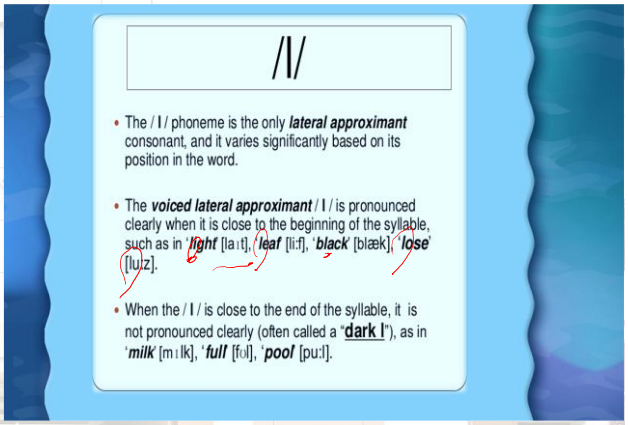


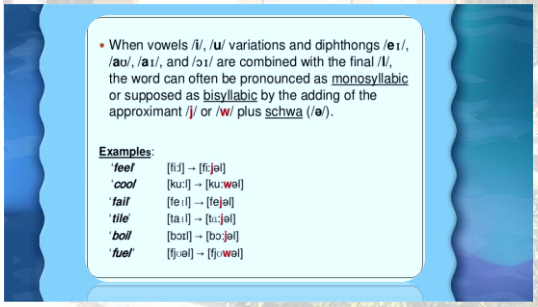


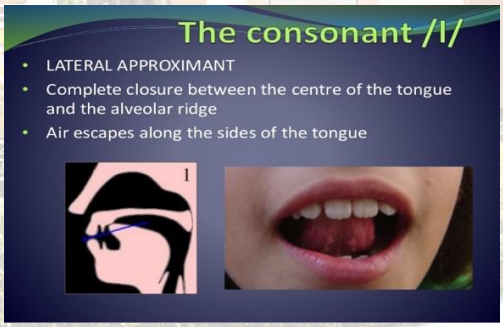




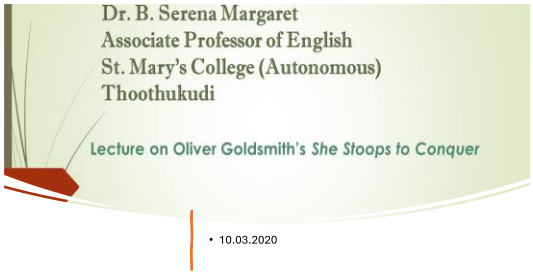


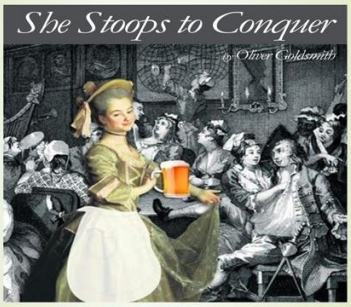




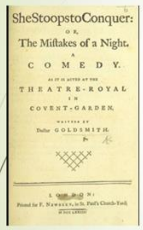


Course: British Drama





First Copy of the Book


SheStoopstoConquer:
OR,
The Miſtakes of a Night.
A
COMEDY.
AS IT IS ACTED AT THE
THEATRE-ROYAL
IN
COVENT-GARDEN.
WRITTEN BY
Doctor GOLDSMITH.

Oliver Goldsmith

An essayist, a poet, and a dramatist.
Anglo-Irish
Polished literary artist
Success as a writer
- The charm of personality emanated by his style
- His affection for his characters
- His mischievous irony
- His spontaneous interchange of gaiety and sadness.

He was, as a writer, "natural, simple, affecting."

Prologue

- *She Stoops to Conquer* opens with a prologue in which an actor mourns the death of the classical low comedy at the altar of sentimental, "mawkish" comedy.
- He hopes that Dr. Goldsmith can remedy this problem through the play about to be presented.

Kate & Constance

Act I

- Act I is full of set-up for the rest of the play.
- Mr. and Mrs. Hardcastle live in an old house that resembles an inn, and they are waiting for the arrival of Marlow, son of Mr. Hardcastle's old friend and a possible suitor to his daughter Kate.
- Kate is very close to her father, so much so that she dresses plainly in the evenings (to suit his conservative tastes) and fancifully in the mornings for her friends.

Act I

- Meanwhile, Mrs. Hardcastle's niece Constance is in the old woman's care, and has her small inheritance (consisting of some valuable jewels) held until she is married, hopefully to Mrs. Hardcastle's spoiled son from an earlier marriage, Tony Lumpkin.
- The problem is that neither Tony nor Constance loves the other, and in fact Constance has a beloved, who will be traveling to the house that night with Marlow.
- Tony's problem is also that he is a drunk and a lover of low living, which he shows when the play shifts to a pub nearby.
- When Marlow and Hastings (Constance's beloved) arrive at the pub, lost on the way to Hardcastle's,
- Tony plays a practical joke by telling the two men that there is no room at the pub and that they can find lodging at the old inn down the road (which is of course Hardcastle's home).

GLIMPSES

Mrs & Mr.Hardcastle
Tony Lumpkin

Marlow & Hastings

Act II

- Act II sees the plot get complicated. When Marlow and Hastings arrive, they are impertinent and rude with Hardcastle, whom they think is a landlord and not a host (because of Tony's trick).
- Hardcastle expects Marlow to be a polite young man, and is shocked at the behavior.
- Constance finds Hastings, and reveals to him that Tony must have played a trick.
- However, they decide to keep the truth from Marlow, because they think revealing it will upset him and ruin the trip. They decide they will try to get her jewels and elope together

Act II

- Marlow has a bizarre tendency to speak with exaggerated timidity to "modest" women, while speaking in lively and hearty tones to women of low-class.
- When he has his first meeting with Kate, she is dressed well, and hence drives him into a debilitating stupor because of his inability to speak to modest women.
- She is nevertheless attracted to him, and decides to try and draw out his true character.
- Tony and Hastings decide together that Tony will steal the jewels for Hastings and Constance, so that he can be rid of his mother's pressure to marry Constance, whom he doesn't love.

Act III

- Act III opens with Hardcastle and Kate each confused with the side of Marlow they saw.
- Where Hardcastle is shocked at his impertinence, Kate is disappointed to have seen only modesty.
- Kate asks her father for the chance to show him that Marlow is more than both believe.
- Tony has stolen the jewels, but Constance doesn't know and continues to beg her aunt for them.
- Tony convinces Mrs. Hardcastle to pretend they were stolen to dissuade Constance, a plea she willingly accepts until she realizes they have actually been stolen.

Act III

- Meanwhile, Kate is now dressed in her plain dress and is mistaken by Marlow (who never looked her in the face in their earlier meeting) as a barmaid to whom he is attracted.
- She decides to play the part, and they have a lively, fun conversation that ends with him trying to embrace her, a move Mr. Hardcastle observes.
- Kate asks for the night to prove that he can be both respectful and lively.

Act IV

- Act IV finds the plots almost falling apart. News has spread that Sir Charles Marlow (Hardcastle's friend, and father to young Marlow) is on his way, which will reveal Hastings's identity as beloved of Constance and also force the question of whether Kate and Marlow are to marry.
- Hastings has sent the jewels in a casket to Marlow for safekeeping but Marlow, confused, has given them to Mrs. Hardcastle (whom he still believes is the landlady of the inn).
- When Hastings learns this, he realizes his plan to elope with wealth is over, and decides he must convince Constance to elope immediately.

Act IV

- Meanwhile, Marlow's impertinence towards Hardcastle (whom he believes is the landlord) reaches its apex, and Hardcastle kicks him out of the house, during which altercation Marlow begins to realize what is actually happening.
- He finds Kate, who now pretends to be a poor relation to the Hardcastles, which would make her a proper match as far as class but not a good marriage as far as wealth.
- Marlow is starting to love her, but cannot pursue it because it would be unacceptable to his father because of her lack of weatlh, so he leaves her.

Act IV

- Meanwhile, a letter from Hastings arrives that Mrs. Hardcastle intercepts, and she reads that he waits for Constance in the garden, ready to elope. Angry, she insists that she will bring Constance far away, and makes plans for that.
- Marlow, Hastings and Tony confront one another, and the anger over all the deceit leads to a severe argument, resolved temporarily when Tony promises to solve the problem for Hastings.

Act V

- Act V finds the truth coming to light, and everyone happy. Sir Charles has arrived, and he and Hastings laugh together over the confusion young Marlow was in.
- Marlow arrives to apologize, and in the discussion over Kate, claims he barely talked to Kate.
- Hardcastle accuses him of lying, since Hardcastle saw him embrace Kate (but Marlow does not know that was indeed Kate).
- Kate arrives after Marlow leaves the room and convinces the older men she will reveal the full truth if they watch an interview between the two from a hidden vantage behind a screen.

Act V

- Meanwhile, Hastings waits in the garden, per Tony's instruction, and Tony arrives to tell him that he drove his mother and Constance all over in circles, so that they think they are lost far from home when in fact they have been left nearby.
- Mrs. Hardcastle, distraught, arrives and is convinced she must hide from a highwayman who is approaching.
- The "highwayman" proves to be Mr. Hardcastle, who scares her in her confusion for a while but ultimately discovers what is happening.
- Hastings and Constance, nearby, decide they will not elope but rather appeal to Mr. Hardcastle for mercy.

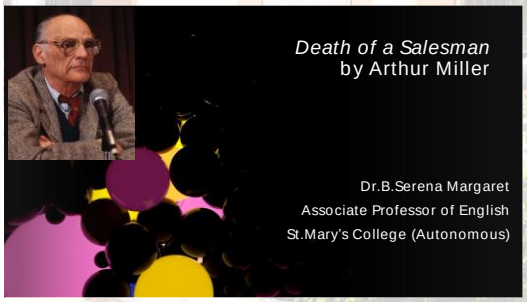
Act V

- Back at the house, the interview between Kate (playing the poor relation) and Marlow reveals his truly good character, and after some discussion, everyone agrees to the match.
- Hastings and Constance ask permission to marry and, since Tony is actually of age and therefore can of his own volition decide not to marry Constance, the permission is granted.
- All are happy (except for miserly Mrs. Hardcastle), and the "mistakes of a night" have been corrected.

Epilogue

- There are two epilogues generally printed to the play, one of which sketches in metaphor Goldsmith's attempt to bring comedy back to its traditional roots, and the other of which suggests Tony Lumpkin has adventures yet to be realized.

Course: American Literature – I MA English Literature



Death of a Salesman

- The American Dream:
- At what cost?

Arthur Miller

- Born in New York City on October 17, 1915
- Began as playwright at University of Michigan
- Pulitzer Prize winner for *Death of A Salesman*
- Double winner of New York Drama Critics Circle Award

Arthur Miller's Legal Troubles

- Suspected of being a Communist sympathizer
- *Death* seen as un-American
- Miller has troubles with McCarthy
- 1953 - Miller denied a passport
- 1957 - Miller convicted of contempt of Congress for refusing to name names And then...
- 1958 - US Court of Appeals overturns his contempt conviction

American Dream

Addresses family conflict in post World War II America

Takes a close look at the price paid for the "American Dream"

Charges America with creating a capitalist materialism centered around a postwar economy

This materialism skewed the original view of the "American Dream" as envisioned by the founding fathers

Death of a Salesman and the American Dream

Death of a Salesman is considered by many to be the quintessential modern literary work on the American dream, a term created by James Truslow Adams in his 1931 book, *The Epic of America.*

This is somewhat ironic, given that it is such a dark and frustrated play.

The idea of the American dream is as old as America itself: the country has often been seen as an empty frontier to be explored and conquered.

Unlike the Old World, the New World had no social hierarchies, so a man could be whatever he wanted, rather than merely having the option of doing what his father did.

Death of a Salesman and the American Dream

- The American Dream is closely tied up with the literary works of another author, Horatio Alger.
- This author grew famous through his allegorical tales which were always based on the rags-to-riches model.
- He illustrated how through hard work and determination; penniless boys could make a lot of money and gain respect in America.

Willy and the American Dream

- Willy believes wholeheartedly in what he considers the promise of the American Dream—that a "well liked" and "personally attractive" man in business will indubitably and deservedly acquire the material comforts offered by modern American life

The death of a dream

- An individual's search for meaning and purpose in life
- Failure in pursuit of success
- Man's need to "leave a thumbprint somewhere in the world."
- An examination of the materialistic values of society

Themes: Problems of Relationship

The love of a father for a son and a son (Biff) for a father

The conflict between father and son

The problem of communication

More Themes

Abandonment:

Willy's life charts a course from one abandonment to the next, leaving him in greater despair each time.

Betrayal:

Willy's primary obsession throughout the play is what he considers to be Biff's betrayal of his ambitions for him.

Symbols

- **Seeds**: opportunity for growth, but will not always germinate.
- **Diamonds**: Material & tangible wealth
- **The Woman's Stockings**: betrayal and infidelity.
- **The Rubber Hose**:
- **Alaska, Africa…The American West**:
- success, failure, potential
- Willy's father found success in Alaska and his brother, Ben, became rich in Africa
- The American West represents Biff's potential

Miller's Modern Tragedy
WILLY as a TRAGIC HERO?

- The hero is a common man.
- The hero struggles against society.
- The hero meets his downfall.
- The downfall is a result of an incompatibility between his own perception of the world and reality

Major Characters

- Willy Loman
- Biff Loman
- Linda Loman
- Happy Loman
- Charley
- Bernard
- Ben
- The Woman
- Howard Wagner
- Stanley
- Jenny
- Miss Forsythe and Letta

Willy Loman

- Father, traveling salesman
- Believes in chasing the American Dream although he never achieves it
- Pins his failed hopes on his sons, Biff and Happy
- Becomes mentally ill when pressure of reality crushes his illusions

Linda Loman

- Loving, devoted wife
- Naïve and realistic of Willy's hopes
- Emotionally supportive of Willy
- Willy's strength

Biff Loman

- Elder son, 34 years old
- High school standout-football star, many male friends, and female admirers
- Academic failures lead to a life of kleptomania
- Represents Willy's vulnerable, tragic side
- Fails to reconcile his father's expectations

Happy Loman

- Younger son, 32 years old
- In Biff's shadow all his life
- Relentless sex and professional drive
- Represents Willy's sense of self importance and ambition
- Often engages in bad business ethics

Charley

- The Lomans' next door neighbor
- Successful businessman
- Often gives Willy financial support
- Described sadly as Willy's only friend although Willy is jealous of Charley's success

Charley

- The Lomans' next-door neighbour
- Successful businessman
- Often gives Willy financial support
- Described sadly as Willy's only friend although Willy is jealous of Charley's success

Bernard

- Charley's son
- Successful lawyer
- Often mocked by Willy for being studious
- Compared to Loman sons by Willy; they do not measure up to his success

Ben

- Willy's deceased older brother
- Independently wealthy
- Appears to Willy in daydreams
- Willy's symbol of success that he desperately wants for his sons

WILLY: I'm not interested in stories about the past or any crap of that kind because the woods are burning, boys, you understand? There's a big blaze going on all around. I was fired today.
BIFF (shocked): How could you be?
WILLY: I was fired, and I'm looking for a little good news to tell your mother, because the woman has waited and the woman has suffered. The gist of it is that I haven't got a story left in my head, Biff. So don't give me a lecture about facts and aspects. I am not interested. Now what've you got so say to me?
(from *Death of a Salesman*)

- Tolerance towards others
- Respect for the culture of other groups
- Helpfulness , Honesty
- Self-discipline ,sharing,
- patience, hard work
- Curiosity , Politeness
- Kindness, Integrity,
- Being humble, empathetic towards others, self-discipline, having courage and integrity

Children absorb values from their parents and teachers.
Families and educators play a crucial role in building values in children and students as they see them as role models.
Learn about the morals of the good life from the holy and religious books.

Values are **principles** or **moral standards** that define someone's behaviour and judgment about what is important in life.

- They are the **essence of our personality** and **influence us to make decisions**, **deal with people** and **organize our time and energy** in our social and professional life.
- The character of each person is shaped by the set of values he cherishes.

Value-oriented education helps us to develop the temper of our mind, compassion in our heart, cooperation with other.
Tolerance towards others, respect for the culture of other groups, helpfulness, honesty, self-discipline are all examples of personalized values. Values such as sharing, patience, hard work, curiosity, politeness, kindness, integrity, being humble, empathetic towards others, self-discipline, having courage and integrity

The main causes of moral degeneration are:
Lack of respect for the sanctity of human life
Breakdown of parental control of children in families
Lack of respect for authority, breaking of the law and total disregard for rules and regulations
Crime and corruption
Abuse of alcohol and drugs
Abuse of women and children, and other vulnerable members of society
Lack of respect for other people and property

Reasons for the need of VE are:
_to teach the values of the culture and society
_to enable them to distinguish between right and wrong to form the conscience of youngsters
_to continue the traditions of the society
_to make meaningful the practices and beliefs
_to connect to every human being in the right way

Internalization of Values

- Internalization of values is a psychological and sociological process in which individuals adopt and integrate the beliefs, norms, and values of their society or group into their own personal value system.
- Internalization makes values become an integral part of the individual's way of thinking and behaving, often guiding their actions and decisions even when external influences are not present.
- Internalization is a complex and ongoing process influenced by various factors, including family, culture, education, and personal experiences. It plays a crucial role in shaping individual behavior and societal norms.

Aspects of Internalization of Values:

1. Socialization:

Primary Socialization: This occurs during childhood and is facilitated by the family. Children learn basic values and norms from their parents and immediate family members.

Secondary Socialization: This happens later in life through institutions such as schools, workplaces, and peer groups. Here, individuals learn values that are specific to these institutions.

Cultural Transmission:

Values are passed down from generation to generation through cultural practices, traditions, and social institutions.

Personal Reflection

Individuals may reflect on and assess the values they encounter, comparing them to their existing beliefs and making adjustments as needed.

Internal Conflict

Sometimes, the values of the society may conflict with an individual's personal beliefs. This can lead to internal conflict and necessitate a reconciliation process.

Role of Reinforcement

Positive reinforcement (e.g., rewards, praise) and negative reinforcement (e.g., punishments, criticism) play significant roles in the internalization process.

Consistency and Repetition

Repeated exposure to certain values and consistent reinforcement of these values help in solidifying them within an individual's belief system.

Examples of Internalization of Values:

- **Honesty** A person might internalize the value of honesty if they grow up in an environment where truthfulness is consistently emphasized and rewarded.
- **Respect for Authority:** Through education and societal norms, individuals may internalize the importance of respecting laws and authorities.
- **Work Ethics** -Exposure to environments that value hard work and dedication can lead to the internalization of a strong work ethic.

Importance of Internalization of Values:

1. **Behavioral Consistency :** Internalized values lead to consistent behavior, as actions are guided by deeply held beliefs rather than external pressures.
2. **Moral Development:** Internalization contributes to the development of a moral compass, helping individuals distinguish right from wrong.
3. **Social Cohesion:** Shared values within a community or society enhance social cohesion and collective identity.

Integrity

The word "integrity" originated from the Latin word "integer," which means a feeling of wholesomeness.

Integrity is a sense of togetherness and completeness that one enjoys while living an honest and moral life.

Ashok Khemka and **Abdul kalam** can be cited as good **examples of people with a high level of integrity.** The recent **scams** like **PMC Bank, and PNB Bank** scam etc are the result of a lack of integrity among individuals showing the low level of integrity prevailing in society.

Ashok Khemka

https://onthinktanks.org/articles/in-conversation-with-ashok-khemka-developing-the-courage-to-do-what-is-right/

Nature of Integrity

- Integrity is the quality of a person being sincere, faithful, and truthful in appearance, speech, and action.
- Integrity is inherited from family, parents, and belief systems.
- Surroundings and situations also impact it.
- The ethical behavior of a person makes them courageous and fearless.

- A person with integrity can look towards any situation in life through self-confidence and courage.
- Integrity makes the person free of guilt as the one who is loyal and honest will never run away from admitting mistakes.
- People with integrity live a peaceful and happy life as they don't have to lie to others to save the truth, which makes them guilt-free.

- A person with integrity is always respected in society as the character of the person is clean.
- There's no specific place to learn integrity, but the two prime areas for a child to learn are school and family.
- There has been a decline in the integrity of our society, which results in the recent uprise in corruption.

Types of Integrity

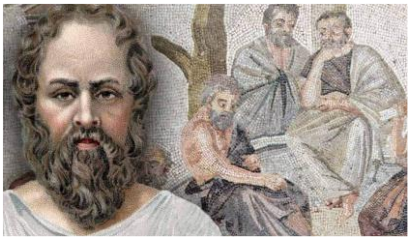
- Intellectual integrity
- Personal Integrity
- Moral Integrity
- Academic Integrity
- Professional integrity

Intellectual integrity

- It requires being willing to stand up for your best judgment of truth by willing to act following the judgment when the need arises.
- When we fail to stand up for our best judgment of truth, we are said to lack intellectual integrity
- One to overcome self-deception and temptation offered by commercialism.
- It is characterized by openness and fairness.

Socrates was an outstanding example of a person of intellectual integrity

Socrates



Personal Integrity

- It is about organizing one's desires, commitments, volitions, values, and actions in such a way that there is no conflict between any one of them.
- When a person possesses personal integrity then various aspects of his self are fully integrated
- It requires that the person should commit to some consistent set of principles and commitments in times of temptations and challenges and uphold these principles or commitments.

Moral Integrity

- Moral integrity refers to consistency and honesty in the application of standards of morality or right and wrong which is used for judging others as well as ourselves.
- It requires an unconditional and unwavering commitment to some of the other moral principles.

For Example, Buddha emphasized the purity of thoughts, words, and deeds.

Academic Integrity

In the academic field, there are a set of moral codes and ethical policies that are to be abided by. This is known as Academic Integrity.

Integrity is needed for the people to flourish and bring morality to their life.

Academic integrity should be developed in early life as it is an essential virtue for the students.

Professional integrity

- Integrity is an essential quality every employer wants in his employees so that he can trust his employees
- Professional integrity increases work productivity and helps in maintaining a positive environment.
- People with professional integrity have a significant benefit at the workplace because they do not have to put in any extra effort, to be honest, and become a person on whom everyone depends.

Humility

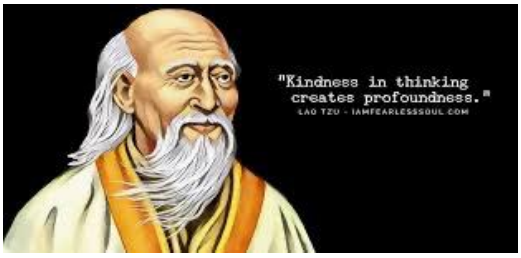
- Humility is considered as the act of lowering oneself in relation to others or having a clear perspective and respect for them.
- A famous way of describing humility is that **"it's not thinking less of yourself, but thinking of yourself less".**
- Humility requires enormous self knowledge, self control, and self esteem. For this reason, it is often paired with leadership.

Leadership & Humility

- To be an effective leader, humility is a very important characteristic.
- Humility combines several traits that help you ultimately connect to people, and earn their respect.
- Humble leaders often acknowledge their own strengths and weaknesses.
- Open to seeking the advice and counsel of others. By doing this, they are able to learn more from others, grow, and also transform their weaknesses into strengths.
- At the same time, it helps them use the strengths of others, instead of trying to solve everything themselves.

- Humility also helps us overcome conflicts and obstacles in life
- Create harmonious situations in both our personal and professional lives.
- Arrogance can repel people, humility can bring them closer.
- Being humble also empowers the people around you.
- When people are made to feel important, they become capable. They are able to recognize their own power and confidently embrace it in order to become better people in life.

According to Lao Tzu, "to lead people, walk behind them".



One of the most famous examples of extreme humility is Mother Theresa.

- **Gave up her own life and decided to take care of the sick, poor, and the dying.**
- **Her work in India inspired many, and showed her love and humility towards the people.**

Truthfulness

- **Truthfulness is like a golden key that unlocks the door to trust and respect among friends, family, and everyone around us.**
- **It's about always being honest, even when it's tough.**
- **It's like a superhero power that everyone can have. It makes you reliable and shows you care about others' feelings and trust.**

Why is truthfulness so important?

- **Truthfulness help us build strong, unbreakable bridges of trust with others. It means our words are valuable, and people can rely on us.**
- **Being honest helps solve problems faster, because everyone knows what really happened and can work together to fix it.**
- **Truthfulness is essential because it builds trust between individuals, fosters strong relationships, promotes integrity, and facilitates a culture of openness and honesty.**
- **It's also crucial for personal growth and the development of a just society.**
- **Truthfulness strengthens relationships by establishing a foundation of trust and reliability.**
- **When people are truthful with each other, they can depend on one another's words and actions, leading to deeper connections and mutual respect.**

Sacrifice

- **Sacrifice is giving up (something important or valued) for the sake of other considerations.**
- **Sacrifice is a personal decision.**
- **A person might sacrifice because they can help someone or they care about someone.**
- **Our parents have given up many valuable years of their lives to love and care for you.**
- **Sacrifices have made everything from simple to life changing.**
- **There is sacrifice of life, time, energy, money, comfort, food, and freedom**

Sacrifice by Military

- **An example is our military, they have signed themselves up for a significant amount of time and or possibly the ultimate life sacrifice.**
- **They serve and risk their lives for our country and that is a sacrifice beyond comparison.**

Sincerity

- **Sincerity is often understood as being truth in the form of actions or words.**
- **A person who means what they say is a sincere person. Sincerity is an essential element to life.**
- **A sincere person is always welcomed because of their truthful mind, friendly attitude and real personality.**
- **A sincere person will enjoy a large circle of friends and inherit the acts of Mary Ward and her circle. A sincere person also has a honest and open mind**

- **Most people would like to trust someone, representing sincerity.**
- **Other dignified features which include having a friendly attitude towards everyone and regarding them with love are a depiction of a sincere person.**
- **They never treat anyone like dirt. Therefore, they usually receive this exact respect from others.**

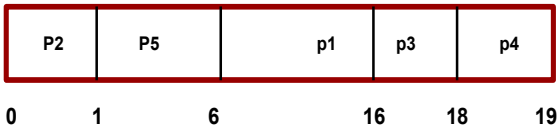
Priority Scheduling

SJFS is a special case of priority scheduling where the process with the lowest CPU burst time is given the highest priority.

Each process is given a priority which is an integer number.

Process	Burst Time	priority
pl	10	3
p2	1	1
p3	2	4
p4	1	5
P5	5	2

Shortest Job First Scheduling (SJFS)



Avg waiting time= (6 +0+16+18+1)/5 = 8.2 milliseconds

Priorities can be defined either internally or externally.

Internally defined priorities use some measurable quantity or quantities to compute the priority of a process.

For example, time limits, memory requirements, the number of open files, and the ratio of average I/0 burst to average CPU burst have been used in computing priorities.

External priorities are set by criteria outside the operating system, such as the importance of the process, the type and amount of funds being paid for computer use, the department sponsoring the work, and other, often political factors.

Priority scheduling can be either preemptive or nonpreemptive.

- When a process arrives at the ready queue, its priority is compared with the priority of the currently running process. A preemptive priority scheduling algorithm
- will preempt the CPU if the priority of the newly arrived process is higher than the priority of the currently running process.
- A nonpreemptive priority scheduling algorithm will simply put the new process at the head of the ready queue.

- A major problem with priority scheduling algorithms is indefinite blocking, or starvation.
- A process that is ready to run but waiting for the CPU is considered blocked.
- A priority scheduling algorithm can leave some low priority processes waiting indefinitely.
- In a heavily loaded computer system, a steady stream of higher-priority processes can prevent a low-priority process from ever getting the CPU.

- A solution to the problem of indefinite blockage of low-priority processes is aging.
- Aging is a technique of gradually increasing the priority of processes that wait in the system for a long time.
- For example, if priorities range from 127 (low) to 0 (high), we could increase the priority of a waiting process by 1 every 15 minutes.

Round-Robin Scheduling

- The round-robin (RR) scheduling algorithm is designed especially for time sharing systems.
- It is similar to FCFS scheduling, but preemption is added to enable the system to switch between processes.
- A small unit of time, called a time quantum or time slice, is defined. A time quantum is generally from 10 to 100 milliseconds in length.
- The ready queue is treated as a circular queue.
- The CPU scheduler goes around the ready queue, allocating the CPU to each process for a time interval of up to 1 time quantum.

- To implement RR scheduling, the ready queue is represented as a FIFO queue of processes.
- New processes are added to the tail of the ready queue.
- The CPU scheduler picks the first process from the ready queue, sets a timer to interrupt after 1 time quantum, and dispatches the process.

One of two things will then happen.

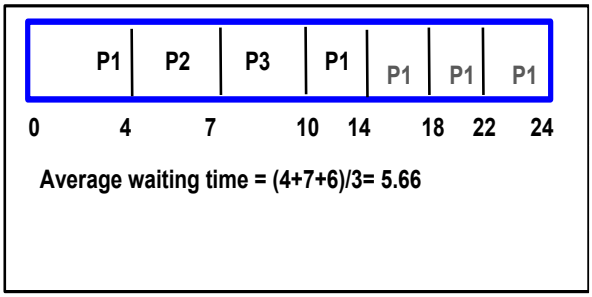
- The process may have a CPU burst of less than 1 time quantum. In this case, the process itself will release the CPU voluntarily. The scheduler will then proceed to the next process in the ready queue.
- Otherwise, if the CPU burst of the currently running process is longer than 1 time quantum, the timer will go off and will cause an interrupt to the operating system. A context switch will be executed, and the process will be put at the tail of the ready queue. The CPU scheduler will then select the next process in the ready queue.

The average waiting time under the RR policy is often long.

Consider Consider the following set of processes that arrive at time 0, with the length of the CPU burst given in milliseconds:

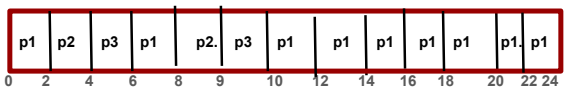
Process	Burst Time
P1	24
P2	3
P3	3

Time quantum is 4 miiliseconds



Average waiting time = (4+7+6)/3= 5.66

Time quantum is 2 miiliseconds



Average waiting t= (8+(8-2)+(9-4))/3 = 6.33

- If the time quantum is extremely large, the RR policy is the same as the FCFS policy.
- In contrast, if the time quantum is extremely small (say, 1 millisecond), the RR approach is called processor sharing.

Assume, for example, that we have only one process of 10 time units.

If the quantum is 12 time units, the process finishes in less than 1 time quantum, with no overhead.

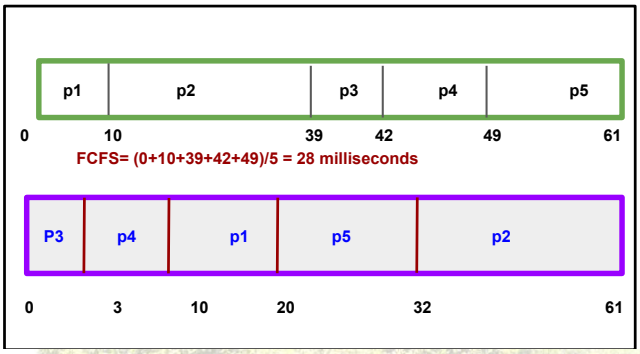
If the quantum is 6 time units, however, the process requires 2 quanta, resulting in a context switch.

If the time quantum is 1 time unit, then nine context switches will occur, slowing the execution of the process accordingly

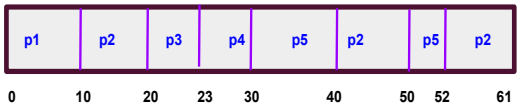
Calculate average waiting time using FCFS,SJF,RR

Process	Burst Time
P1	10
p2	29
P3	3
p4	7
Ps	12

SJF=(10+32+0+3+20)/5=13



Round Robin (quantum =10 ms)

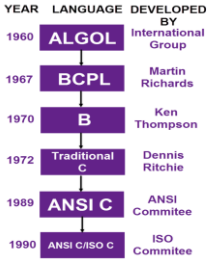


RR= (0 + 32+20+23+40) / 5 = 22.6 miiliseconds

Course: C Programming

Class: I B.Sc. Computer Science

History of C



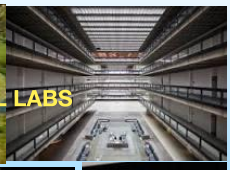
ALGOrithmic Language

Basic Combined ProgrammingLanguage

History of C

What is C Language?

- It is a high level programming language
- It is a structured language
- It is machine independent



Ken Thompson

Denis Ritchie

Brian Kernighan

- The root of all modern languages is ALGOL
- Introduced in the early 1960s.
- ALGOL was the first computer language to use a block

- In 1967, Martin Richards developed a language called BCPL (Basic Combined Programming Language) primarily for writing system software.

In 1970, Ken Thompson created a language using many features of BCPL and called it simply B.

B was used to create early versions of UNIX operating system at Bell Laboratories.

Both BCPL and B were "typeless"system programming languages.

- C was evolved from ALGOL, BCPL and B by Dennis Ritchie at the Bell Laboratories in 1972.
- C uses many concepts from these languages and added the concept of data types and other powerful features.
- UNIX operating system, which was also developed at Bell Laboratories, was coded almost entirely in C.
- UNIX is one of the most popular network operating systems in use today and the heart of the Internet data superhighway.

- During 1970s, C had evolved into what is now known as "traditional C".
- The language became more popular after publication of the book 'The C Programming Language' by Brian Kerningham and Dennis Ritchie in 1978.
- The rapid growth of C led to the development of different versions of the language that were similar but often incompatible. This posed a serious problem for system developers.
- To assure that the C language remains standard, in 1983, American National Standards Institute (ANSI) appointed a technical committee to define a standard for C. The committee approved a version of C in December 1989 which is now known as ANSI C.

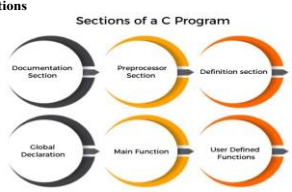
IMPORTANCE OF C

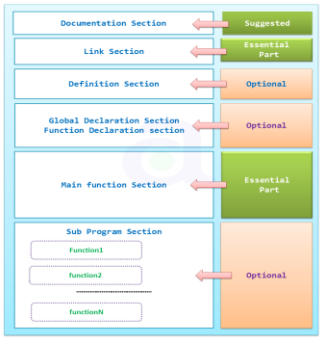
- It is a robust language
- It has a rich set of built-in functions and operators
- It can be used to write any complex program.
- It is well suited for writing both system software and business packages.
- Programs written in C are efficient and fast. This is due to its variety of data types and powerful operators.

- Its strength lies in its built-in functions. Several standard functions are available which can be used for developing programs.
- C is highly portable. This means that C programs written for one computer can be run on another with little or no modification.
- C language is structured programming thus requiring the user to think of a problem in terms of function modules or blocks. A proper collection of these modules would make a complete program. This modular structure makes program debugging, testing and maintenance easier.
- Another important feature of C is its ability to extend itself. A C program is basically a collection of functions that are supported by the C library. We can continuously add our own functions to C library. With the availability of a large number of functions, the programming task becomes simple.

A C program basically consists of the following parts:

- Documentation
- Preprocessor / Link Section
- Definition
- Global Declarations
- Main Function
- User Defined Functions





Documentation

- This section consists of the description of the program, the name of the program, and the creation date and time of the program.
- It is specified at the start of the program in the form of comments.
- Documentation can be represented as:

```
// description, name of the program, programmer name, date, time etc.
or
/*
   description, name of the program, programmer name, date, time etc.
*/
```

- Anything written as comments will be treated as documentation of the program and this will not affect the code
- Basically, it gives an overview to the reader of the program

What is a header file and Why preprocessor directives are used?

Some functions are written by users, like us, and many others are stored in C library.

Library functions are grouped category wise and stored indifferent files known as header files. If we want to access the functions stored in the library, it is to tell the compiler about the files to be accessed.

This is achieved by using the preprocessor directive #include

#include < filename>

filename is the name of the library file that contains the required function. Preprocessor directives are placed at the beginning of a porgarm.

Preprocessor Section

- The preprocessor section contains all the header files used in a program.
- It informs the system to link the header files to the system libraries.
- It is given by: #include<stdio.h>
- The #include statement includes the specific file as a part of a function at the time of the compilation.
- The contents of the included file are compiled along with the function being compiled.
- The #include<stdio.h> consists of the contents of the standard input output files, which contains the definition of stdin, stdout, and stderr. Whenever the definitions stdin, stdout, and stderr are used in a function, the statement #include<stdio.h> need to be used.
- There are various header files available for different purposes. For example, # include <math.h>. It is used for mathematic functions in a program.

Definition Section

The define section comprises of **different constants declared using the define keyword.**

It is given by:

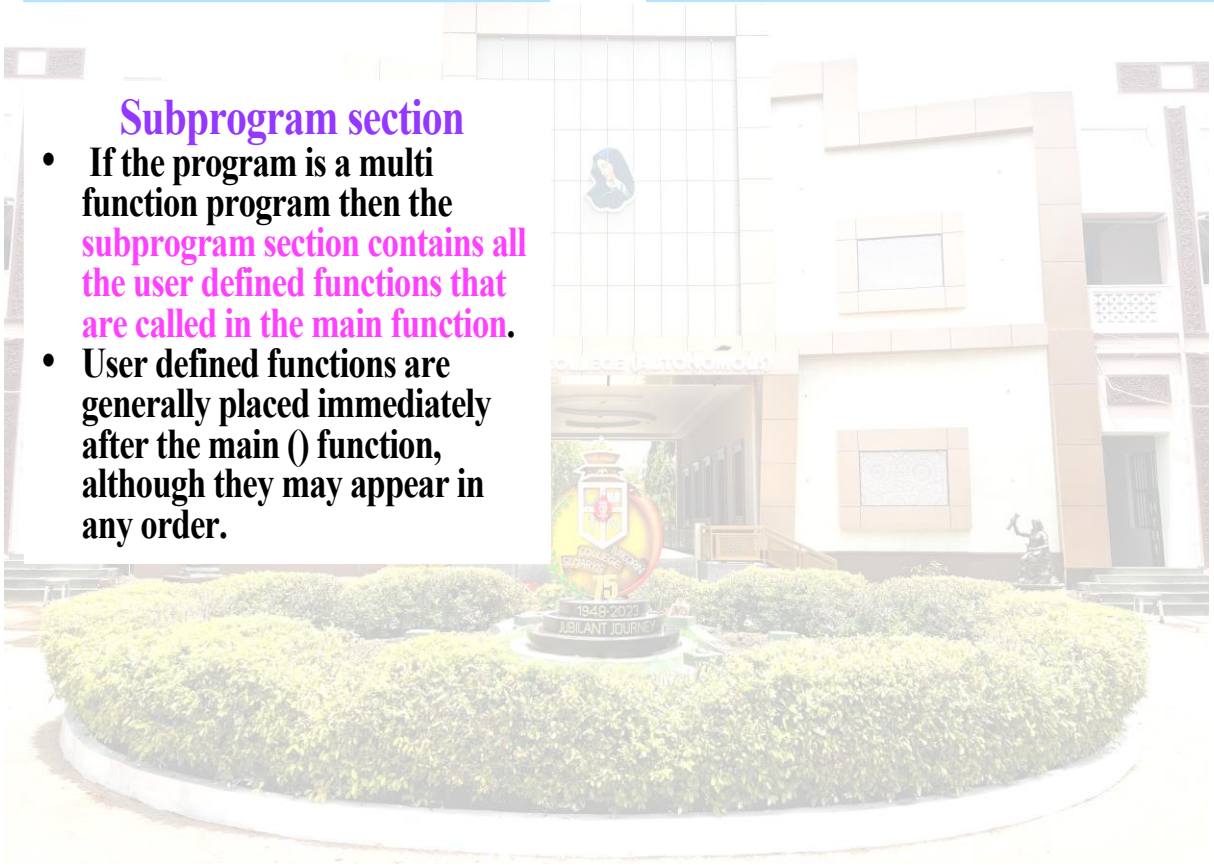
#define a = 2

Global Declaration Section

- This section includes all global variables, function declarations, and static variables.
- The variables declared in this section can be used anywhere in the program.
- They're accessible to all the functions of the program. Hence, they are called global variables.

```
int a = 5;
```

main () function section:
Every C program must have one main function section
•This section contains two parts; declaration part and executable part
•Declaration part:
•The declaration part declares all the variables used in the executable part.
Executable part:
•There is at least one statement in the executable part.
These two parts must appear between the opening and closing braces.
•The program execution begins at the opening brace and ends at the closing brace. The closing brace of the main function is the logical end of the program. All statements in the declaration and executable part end with a semicolon.



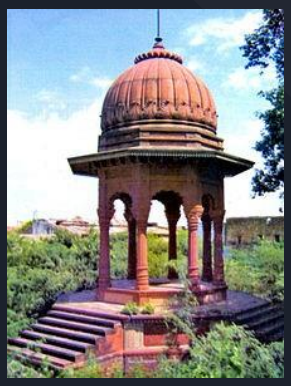
Subprogram section

- If the program is a multi function program then the subprogram section contains all the user defined functions that are called in the main function.
- User defined functions are generally placed immediately after the main () function, although they may appear in any order.

Title of the course: Indian Art

Class : I MA History

GLOSSARY



Indian Art

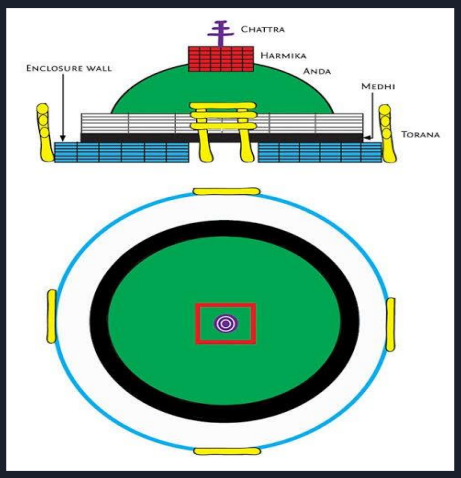
Architecture

Chaitya / Caitya

Generally any sacred space, but usually means a shrine or prayer hall which has a stupa at one end

Harmika

Square railings at the top of a stupa, betewen the anda and the chattravali, which originally represented a platform/ enclosure with a fence.

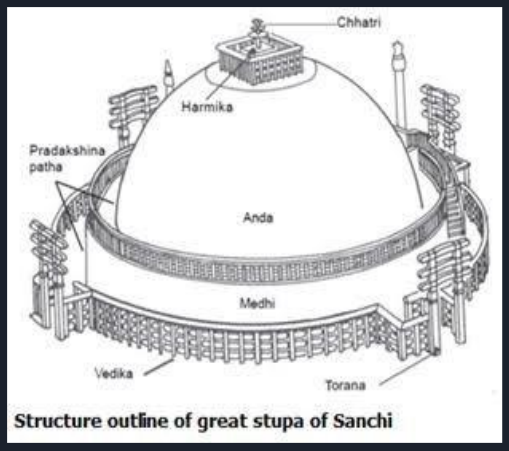


Stambha

Pillar or post

Vedika

Railing, especially of a sacred enclosure



Structure outline of great stupa of Sanchi

Torana

Ceremonial gateways in the fence surrounding a stupa, of which there are usually four, often richly decorated

Stupa

Originally a pre-Buddhist burial mound; this word is now used for the pre-eminent type of Buddhist monument, which is at least a freestanding mound, usually with a circular drum (medhi) forming the base for a massive solid dome (anda) topped by a turret (chattri); the bell or dome shaped mound covers the relics or holy objects; as the stupa architecturally becomes more complicated, so the word "Stupa" is applied in general to monuments and whole temples, interchangable in referring to many sites with words such as Pagoda, Wat, Candi

Vihara

Residential quarters of a Buddhist monastery, or by extension a monastery generally

Image Hall

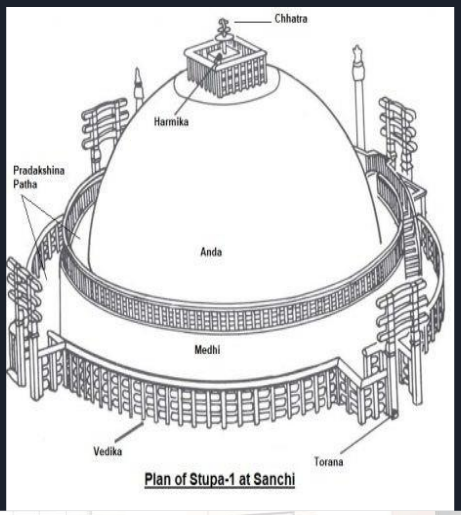
In a Buddhist monastery, the image hall is the one which contains the (main) statue of the Buddha

Gandhakuti

Literally a “perfumed chamber” – used to mean shrines placed around a stupa

Chattri

An umbrella -shaped dome or pavilion, sometimes acting as a turret on the roof of a stupa



Plan of Stupa-1 at Sanchi

Radiate boundless Love Towards all beings

Course : Pteridophytes, Gymnosperms and Paleobotany II UG Botany

Pteridophytes, Gymnosperms and Paleobotany

Introduction to Pteridophytes

- Pteris – Feather
- Phyta – Plants
- First Terrestrial plants
- Vascular Cryptogams – Presence of Xylem and Phloem
- Based on their leaves
- Pinna
- Fronds

Important Characters of Pteridophytes

- First Terrestrial plants (Snakes of Plant Kingdom)
- Originated in the Silurian Period of Paleozoic era
- Represented by 400 living and fossil genera
- Sporophyte – Dominant
- Vascular tissues – Xylem and phloem
- Sporophyll and Sporangium
- Jacketed Archesporium
- Motile antherozoids

Habitat

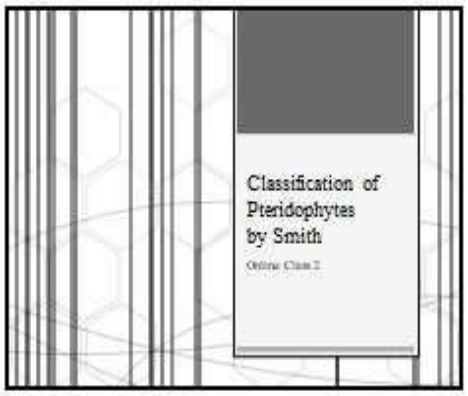
- Terrestrial – Cool, moist and shady places eg. Fern

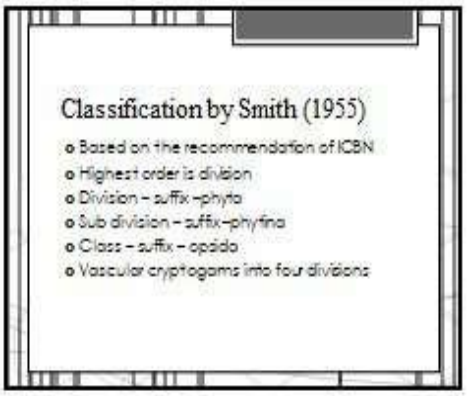
Habitat

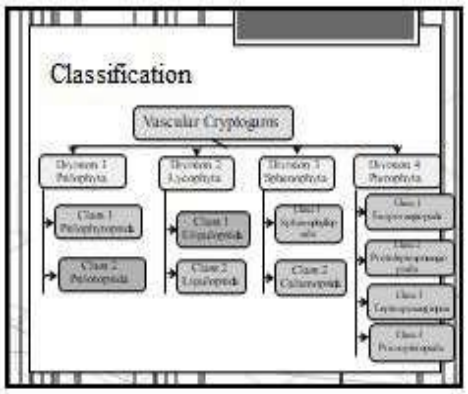
- Aquatic – Lives in water
eg. *Azolla, Marsilea*

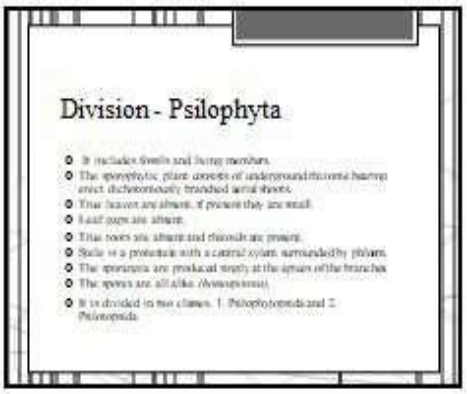
Habitat

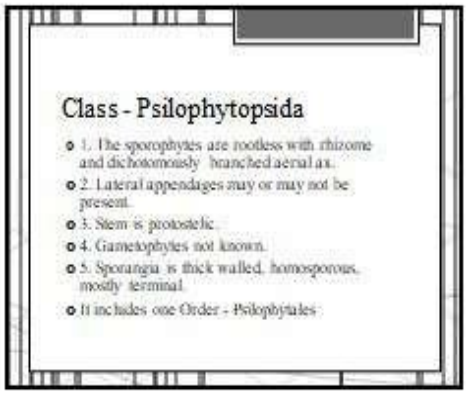
- Xerophytic – Dry and extreme environmental condition. eg. *Equisetum*

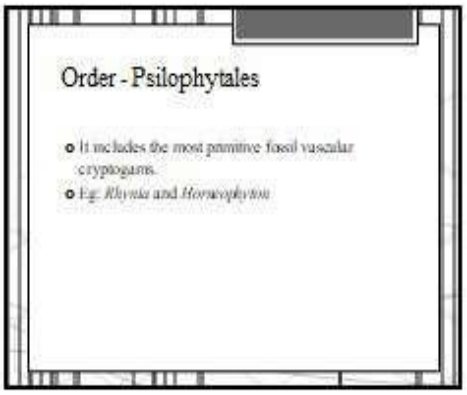

Classification of
Pteridophytes
by Smith
Online Class 2


Classification by Smith (1955)
Based on the recommendation of ICBN
Highest order is division
Division – suffix –phyta
Sub division – suffix–phytina
Class – suffix – opsida
Vascular cryptogams into four divisions


Classification
Vascular Cryptogams


Division - Psilophyta


Class - Psilophytopsida
1. The sporophytes are rootless with rhizome and dichotomously branched aerial axis.
2. Lateral appendages may or may not be present.
3. Stem is protostelic.
4. Gametophytes not known.
5. Sporangia is thick walled, homosporous, mostly terminal.
It includes one Order - Psilophytales


Order - Psilophytales
It includes the most primitive fossil vascular cryptogams.
Eg. Rhynia and Horneophyton

Stelar Evolution in Pteridophytes

What is a Stele?

- The term stele has been derived from a Greek word meaning pillar.
- According to the older botanists, the vascular bundle is the fundamental unit in the vascular system of pteridophytes and higher plants.
- According to Van Tieghem and Douliot (1886), the stele is defined as a central vascular cylinder, with or without pith and delimited the cortex by endodermis.

Protostele

- The primitive type of stele.
- In protostele, the vascular tissue is a solid mass and the central core of the xylem is completely surrounded by the strand of phloem.
- This is the most primitive and simplest type of stele.

Types of Stele

- Van Tieghem and Douliot (1886) recognized only three types of steles.
- They also thought that the monostelic shoot were rare in comparison of polystelic shoots.
- It is an established fact that all shoots are monostelic and polystelic condition rarely occurs.
- The stele of the stem remains connected with that of leaf by a vascular connection known as the leaf supply.

Types of Protostele

- Haplostele
- Actinostele
- Plectostele
- Mixed Protostele

Heterospory and Seed Habit

Origin of Heterospory

- The origin of heterospory can be better discussed on the basis of evidences from
- palaeobotany,
- developmental and
- experimental studies.

Heterospory

- Some Pteridophytes which produce two different types of spores (differing in size, structure and function).
- Such Pteridophytes are known as heterosporous and the phenomenon is known as heterospory.
- The two types of spores are microspores and megaspores.
- Microspores are smaller in size and develop into the male gametophyte while the megaspores are large and develop into female gametophyte.

1. Palaeobotanical evidences

- It has been suggested that heterospory arose due to degeneration of some spores in a few sporangia.
- As more nutrition becomes available to few number of spores, the surviving spore grow better, hence increase in their size.
- Palaeobotanical evidences show that the earlier vascular plants were all homosporous and the heterosporous condition appeared subsequently in the lowermost upper Devonian.
- A number of heterosporous genera belonging to the Lycopsids, Sphenopsids and Pteropsis were known in the late Devonian and early Carboniferous periods.

- According to Rashid (1976) only 9 genera of Pteridophytes are heterosporous.
- These are
- *Selaginella*,
- *Isoetes*,
- *Salvinia*,
- *Marsilia*,
- *Pilularia*,
- *Regnellidium*,
- *Salvinia*,
- *Azolla* and
- *Platyzoma*.

- According to Williamson and Scott (1894) two species of Calamostachys form the initial steps that might lead to the heterospory.
- These species were C. binneyana and C. casheana. In C binneyana most of the sporangia were with large number of small spores in tetrads but in some sporangia spores were large.

Economic Importance of Pteridophytes

- Many plants are edible and used in form of vegetable.
- *Ampelopteris prolifera, Isoetes* used as food.
- *Osmunda cinnamomea* use as vegetable.
- *Azolla* also used as food production they have higher carbohydrates and protein values.
- *Equisetum arevense* whole plant are used in food production.
- The tuber of *Isoetes* are used as food.
- *Neprolepis biserrata* rhizome are edible.

- The economic value of pteridophytes have been known to men for more than 2000 years and have been found as an important source of food and medicine.
- Pteridophytes are usually useful but few are harmful.

As Medicine

- Plant Medicinal uses
- *Pteris multifold* used in cancer, diarrhoea hepatitis..
- *Ophioglassum costatum* Used in antiviral, antidote to snake bite, their rhizome used in bleeding nose.
- *Marsilea condensata* Leaves are used, diuretic and plant used in snake bite diarrhoea.
- *Lycopodium japonicum* Used for expulsion of intestional worms.

- Pteridophytes are used in various fields—
- 1. As soil conservation
- 2. As bio fertilizer
- 3. As food
- 4. As ornamental
- 5. As entertainment
- 6. As medicinal used
- 7. As chemical production
- 8. As manufacturing
- 9. Metal accumulators

- Adiantum capillms Anticancerus and Antibacterial plants.
- Adiantum lunulatum as blood related diseases
- Adiantum candatum skin disease
- Actinopteris redista antimalarial
- Aspelnium falcatum anthelmintic and tapeworms reducer
- Azolla pinnata Antifungal and antibacterial
- Equisetion ramosissimum diuretic and used in diarrhoea
- Selaginella boryoides liver diseases
- Dryopteris cochleata used antibacterialin
- Pteridium revolutum gastric and intestinal diseases


1848-2023
JUBILANT JOURNEY

Lycopodium - Anatomy

Cortex

- Inner to the epidermis is present a wide zone of cortex which shows a great variation in its structure in different species.
- **Usually four types of cortex are recognized:**
- (i) The whole of the cortex is made up of parenchymatous cells with small or large intercellular spaces (e.g., *L. selago*). Such cortex is called homogeneous.
- (ii) The whole of the cortex is made up of sclerenchymatous cells, without intercellular spaces.
- (iii) The cortex is differentiated into outer and inner sclerenchymatous cells and middle parenchymatous cells (e.g., *L. clavatum*).
- (iv) The cortex is differentiated into outer and inner parenchymatous cells and middle sclerenchymatous cells (e.g., *L. cernuum*).

A transverse section (T.S.) of the stem

- Circular in outline and can be differentiated into following three regions
- Epidermis
- Cortex
- Stele

- Next to the cortex is present a single layer of well-defined cells known as endodermis.
- with conspicuous casparian strips but at maturity the endodermis may or may not be a distinct structure.
- Endodermis is followed by pericycle which is composed of one or more layers of compactly arranged parenchymatous cells.

Epidermis

- It is the outermost covering layer comprising of single cell in thickness.
- The epidermis is cutinised on the outer side and interrupted at places by the presence of stomata.

Stele

- It is made up of only primary xylem and primary phloem.
- It is a protostele i.e., pith is absent and the stele is situated in the centre.
- The arrangement of xylem and phloem tissues is different in different species and the stele is also named differently.

Reproduction in *Lycopodium*

By the Formation of Gemmae or Bulbils

- These are modified lateral branches which develop on the stem apex in the axils of leaves
- Each bulbil consists of a short axis where several thick and fleshy leaves are arranged spirally and compactly.
- These leaves store food material.
- These bulbils fall on the ground and grow into new sporophytic plants.
- e.g., many Urostachya members like *L. selago; L. phlegmaria and L. lucidulum*

Types of Reproduction

- In *Lycopodium* we can find three types of reproduction.
- Vegetative reproduction
- Asexual reproduction
- Sexual reproduction

By Fragmentation and Decay

- In this method, the progressive death and decay of older parts reach the region of branching; as a result the two branches separate and each branch develops into a new plant
- e.g., *L. inundatum* and other creeping species.
-

Vegetative Reproduction

- It happens through
- By the Formation of Gemmae or Bulbils
- By Fragmentation and Decay
- By the Formation of Adventitious Buds
- By the Formation of Root Tubercles

By the Formation of Adventitious Buds

- The adventitious buds are formed near the base of the main stem and on separation from the main axis they are capable of forming new plants
- e.g., *L. phlegmaria, L. reflexum*

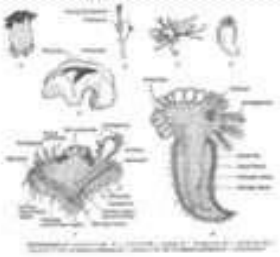
Lycopodium - Sexual Reproduction

- Of these two cells, the one nearer to rhizoidal cell is called basal cell which does not divide further.
- The other cell, by further divisions, forms apical cell with two cutting faces.
- The further development of gametophyte does not proceed if there is no infection into the basal cell by the mycorrhizal fungus.

Gametophyte

- Lycopodium is homosporous, therefore, spore germinates exosporically to produce gametophytic prothallus, which bears both male and female sex organs (i.e., monoecious and homothalic).
- The germination of the spores may be immediate in some species (e.g., Lycopodium cernuum, L. inundatum) or after a delay of several years (L. clavatum, L. complanatum).

Mature prothalli

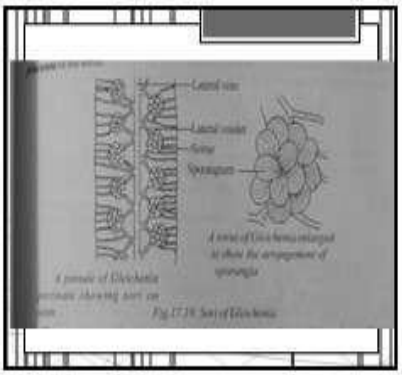


- The spores absorb water before germination.
- The first division of the spore is asymmetric to produce one small biconvex rhizoidal cell and a large cell. Soon after this division, the exine ruptures along the triradiate ridge.
- The rhizoidal cell disintegrates, while the large cell again divides by a vertical wall to form two cells.

Cernuum Type

- These types of gametophytes are found in most of the tropical species (e.g. L. cernuum, L. innunda- tum).
- Here spore germinates immediately and the gametophyte completes its growth in one season.
- The prothalli are small, green and aerial with a lower conical basal region buried in the soil.
- Rhizoids occur in the colourless subterranean (basal) region.

Diaranopteris - Reproduction



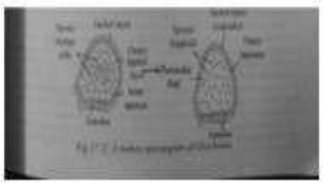
- Diploid Sporophyte
- Reproduce by two ways
- Asexual and sexual reproduction

Mature Sporangia

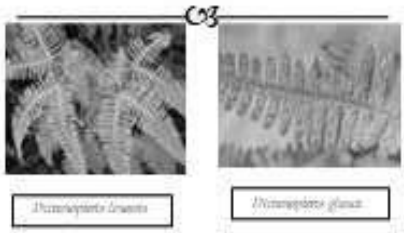
- Pear shaped.
- Sessile or sub sessile
- Consists of capsule, tapetum and spore mother cells
- Capsule forms the jacket layer
- Tapetum – Outer wall – tubular cells, inner wall – elongated cells
- Spore mother cells – diploid – undergoes meiosis – haploid spores
- A sporangium may produce 128 to 1024 spores

Asexual Reproduction

- Spores
- Homosporous
- Spores- sporangia
- Group of sporangia – Sori
- Sori produced on the ventral side of the pinnule.
- They are naked without indusium
- The sori are produced on the lateral veinlets, behind the vein endings or at the middle of the vein in two distinct rows
- Each sorus consists of 4 to 15 sporangia



Dicranopteris / Gleichenia



Systematic position

- Division : Pteriophyta
- Class : Filicopsida
- Order : Filicales
- Family : Gleicheniaceae
- Genus : Gleichenia / Dicranopteris

Sporophyte

- Diploid sporophyte
- Herbaceous and perennial
- Consists of
- Rhizome
- Root and
- Leaf

Distribution

- It is a fern.
- Largest genus with 130 species
- Tropical and subtropical regions of the world
- In India – Southern India, Western Ghats, Eastern Himalaya and Kumaon Hills
- Famous Indian Spp. *Dicranopteris linearis* and *D glauca*
- All the species are terrestrial and xeropfytic.

Rhizome

- It is the stem
- Dichotomously branched, prostrate and subterranean
- Covered with scales


1848-2023
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