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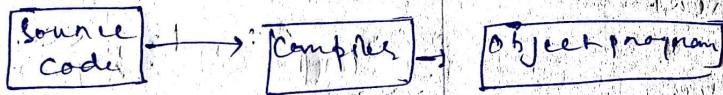
Subject - Compiler Design (623) Date - 2/02/2021

Proff - Dr. Joyoy Das. Semester - II

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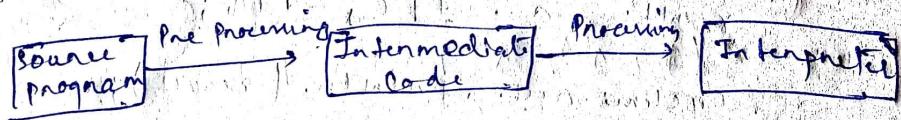
Q.1 A compiler is a computer program that transforms code written in high level language into machine code.

- It scans the whole program in one go, and shows all the errors together at the end.
- Its execution time is very fast.
- It takes more space on memory, e.g., C, C++, Java.

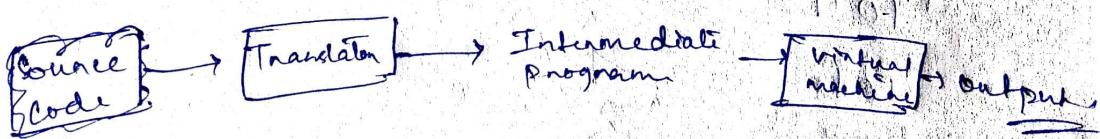


An interpreter is a computer program which translates a HLL statement to machine code.

- It scans one statement for a time, thus showing the errors one by one.
- Its execution time is slow ex - Python, Ruby, etc.



A hybrid compiler translates at HLL to an intermediate byte code for later interpretation. It has feature of both compiler and interpreter. They are also known as just in time compiler.



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2. Advantage of compiler over the interpreter is given below-

- 1) Compiler takes less time to translate the code it means it produce fast execution because it translated the code in single step whereas in interpreter translate line by line so it takes more time to translate the code.
- 2) Compilers can generate object code significantly more effective and easily than the interpreters.
- 3) Errors are shown instantly if we used compiler . however in the interpreter it takes the time.

Advantages of interpreters over the compilers is -

- 1) An interpreter is a computer program which analyzes and implements at high level language code into intermediate language code , which is later executed.
- 2) The Intermediate code generated by the interpreter makes the program portable in nature . There are various program that are being executed over web servers. With the increase use of web applications, it is evident to make use of something that may produce machine independent code. javascript can be considered as a very good example for this interpretation .

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- 3) An interpreter provides user an advantage of stopping the execution of the program in between to resolve errors and then continues with the further execution.

D.3

$$S \rightarrow .OB(1.A)$$

$$A \rightarrow 0|0s|1AA|\epsilon$$

$$B \rightarrow 1|1s|0BB|\epsilon$$

$$\text{String} = 00110101$$

$$S \rightarrow OB \rightarrow 00s \quad (B \rightarrow 0s)$$

$$\rightarrow 001A \quad (s \rightarrow 1A)$$

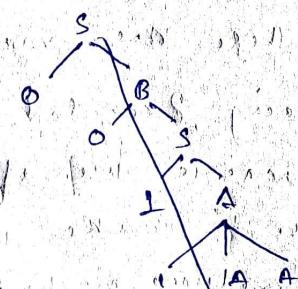
$$\rightarrow 0011AA \quad (A \rightarrow 1AA)$$

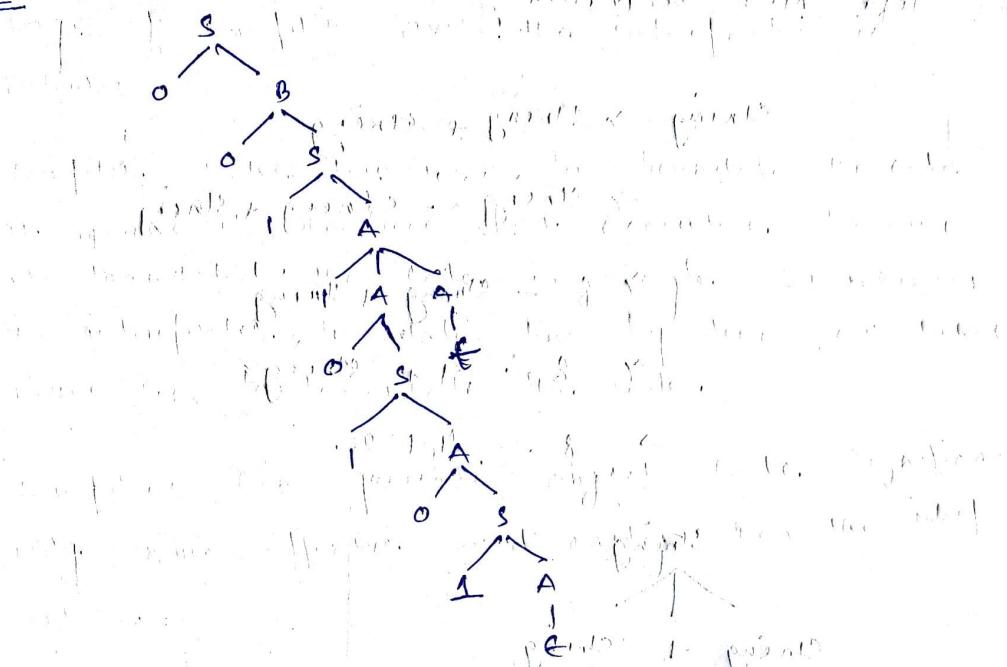
$$\rightarrow 001101SA \quad (A \rightarrow 0s)$$

$$\rightarrow 00110101AA \quad (S \rightarrow 1A)$$

$$\rightarrow 00110101A \quad (A \rightarrow \epsilon)$$

$$\rightarrow 00110101 \quad (A \rightarrow \epsilon)$$

Parse tree

Parse treeB.4Ambiguous Grammar

Grammar is ambiguous if it generates more than one left most derivations or more than one right most derivations for the same sentence or string. In other words, if a string can be derived in more than one way.

Ambiguous grammar is not acceptable for parsing.

Ex :-

~~String $\rightarrow id + id * id$~~

~~Grammar $\rightarrow E \rightarrow E+E | E * E | E/E | b/fid$~~

Now,

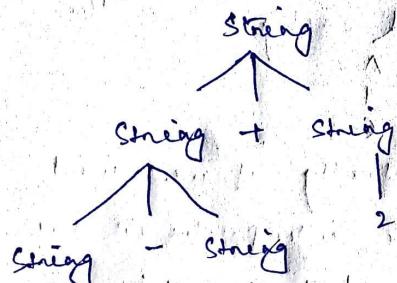
Since string, $g = 4+2$

String \rightarrow string + string | string + string | 0/1/2

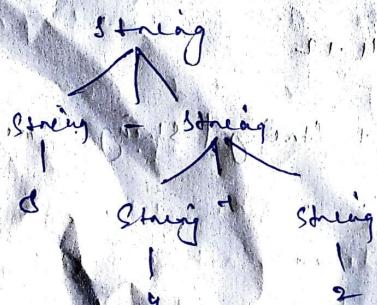
3/4/5/6/7/8/9

Left most derivation

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left Most Derivation $\text{String} \rightarrow \text{String} + \text{String}$ $\rightarrow \text{String} - \text{String} + \text{String}$ $\rightarrow 8 - \text{String} + \text{String}$ $\rightarrow 8 - 4 + \text{String}$ $\rightarrow 8 - 4 + 2$ 

Again left Derivation -

 $\text{String} \rightarrow \text{String} - \text{String}$ $\rightarrow 8 - \text{String}$ $\rightarrow 8 - \text{String} + \text{String}$ $\rightarrow 8 - 4 + \text{String}$ $\rightarrow 8 - 4 + 2$ 

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In both case there are two different parse tree created which shows grammar is ambiguous.

Q.5

$$\text{length} = n$$

$$\text{then, prefix} \geq n$$

$$\text{Suffix} \leq n$$

$$\text{profile prefix} \geq n+1$$

$$\text{length} \geq n+2$$

$$\text{then, prefix} \geq n+2$$

$$\text{suffix} \geq n+2$$

$$\text{profile of prefix} = n+1$$