COMPILER CAT 2 ANSWERS

Q.1 a) What do you mean by SDTS. Explain with example.

In syntax directed translation, along with the grammar we associate some informal notations and these notations are called as semantic rules.

So we can say that

- 1. Grammar + semantic rule = SDT (syntax directed translation)
- In syntax directed translation, every non-terminal can get one or more than one attribute or sometimes 0 attribute depending on the type of the attribute. The value of these attributes is evaluated by the semantic rules associated with the production rule.
- In the semantic rule, attribute is VAL and an attribute may hold anything like a string, a number, a memory location and a complex record
- o In Syntax directed translation, whenever a construct encounters in the programming language then it is translated according to the semantic rules define in that particular programming language.

Example

| Production | Semantic Rules |
|-----------------------|------------------------|
| $E \rightarrow E + T$ | E.val := E.val + T.val |
| $E \to T$ | E.val := T.val |
| T → T * F | T.val := T.val + F.val |
| $T \rightarrow F$ | T.val := F.val |
| $F \rightarrow (F)$ | F.val := F.val |
| F → num | F.val := num.lexval |

E.val is one of the attributes of E.

num.lexval is the attribute returned by the lexical analyzer.

| 1, ' | Translation Scheme! - |
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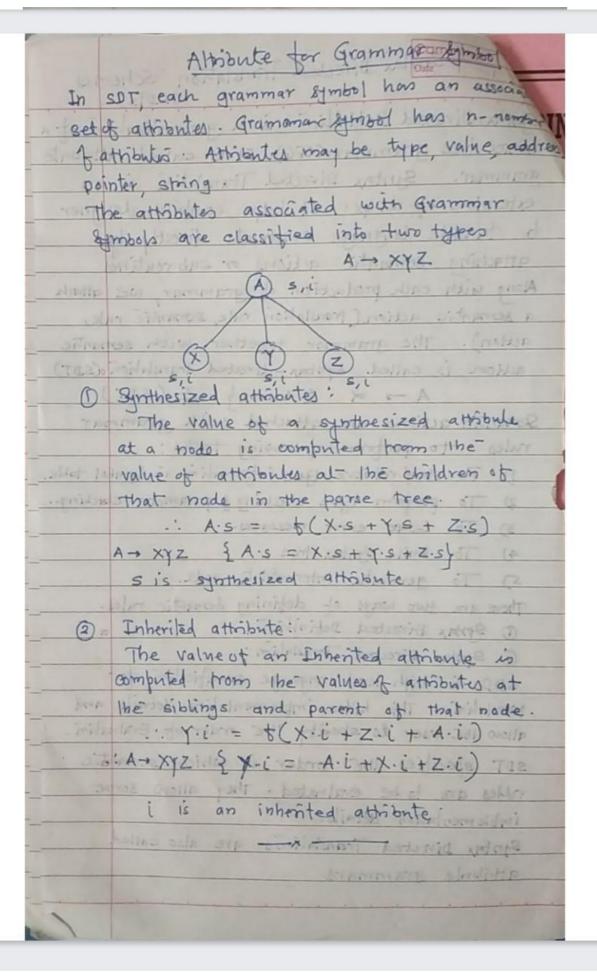
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| | production to move the translature of construct pary. |
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| | during the parsing of source code |
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| | wants another token |
| 3 | perform the action of semantic analyzer. |
| | perform the action of intermediate code generator. |
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Sintax Directed Definition is a generalization of a contex free grammar (CFG). It is called attribute grammar. Syntax Directed Translation is an extension of effs. It helps compiler designer to translate language constructs directly by attaching semantic actions or subroutines Along with each production of grammar we attach a semantic action. (translation rule, semantic rule, action). The grammar together with semantic action is called syntax - directed translation (SDT) A -> & & Action 4 (SDT) Semantic actions are attached with grammar rules to perform tollowing tasks: 1) To stord retrieve type information in symbol toble. 2) To perform type checking & parameter checking. 3) To issue error messages. 4) To build syntax tree A A A A To generate intermediate code.

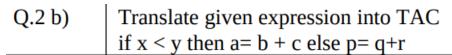
Q.1 b) | Define Attribute. Explain different types of attributes.

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| 7 -> F 7. val = F | | | |
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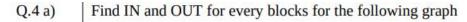
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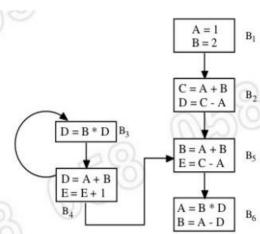


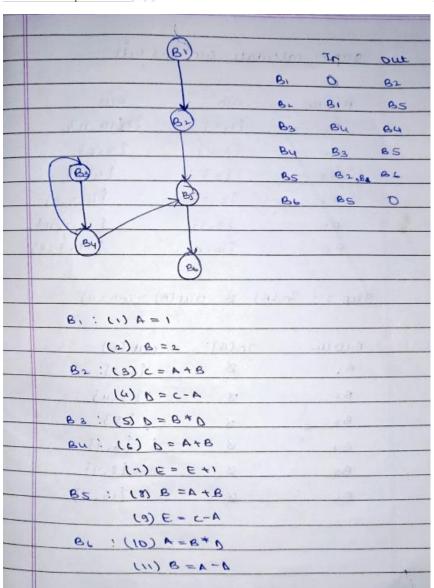
Q.2 a) Translate the expression A: = -B * (C + D)/E



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