APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

08 PALAKKAD CLUSTER

Q. P. code : 2A-17-2 **(pages: 3)** **Name:** **Reg No:**

SECOND SEMESTER M.TECH DEGREE EXAMINATION APRIL/MAY 2017

08CS 6012 ADVANCED COMPILER DESIGN

Time: 3 hours **Max. Marks: 60**

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1 a	Distinguish between L attributed definition and S attributed definition	3
	Answer b or c	
b	Obtain a set of productions and semantic rules for the following grammar Non terminal T generates either a basic type ,interger,float,char, boolean or arrays. Show the syntax directed translation of the input char [3][4] in to array [1..3,1..4] of char.	6
c	For a while statement obtain (i) Syntax directed definition (ii) syntax directed translation (iii) Implementation of translation of while statement with a recursive –descent parser	6

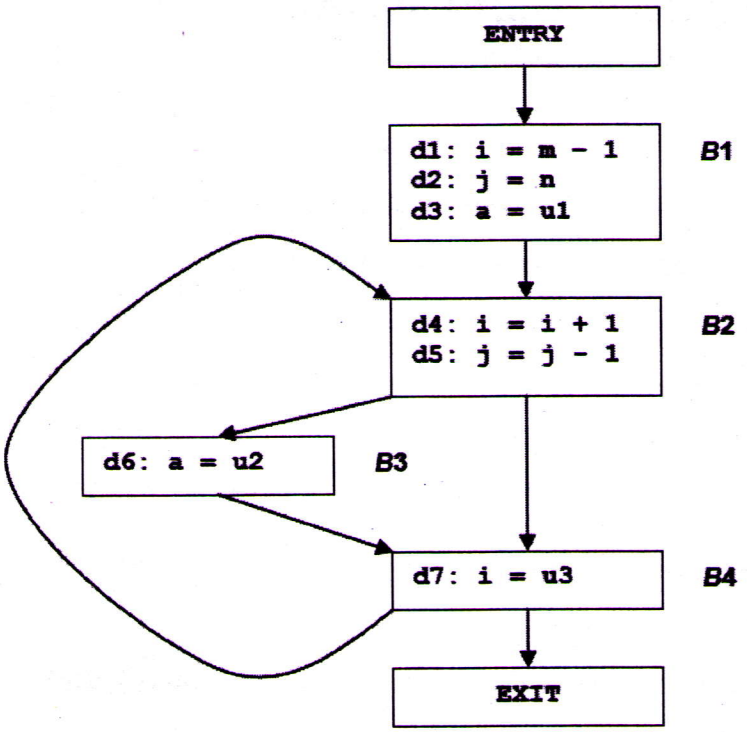
Q.no	Module 2	Marks
2.a	Explain an application of DAG	3
	Answer b or c	
b	Translate the following expression 5+a[i][j] using an SDT with address calculations of array references , in the following set of productions. Draw the annotated parse tree and write the three address statements E→E1+E2 E→**id** E→ L L→**id**[E]	6

c	Write the semantic rules for the generation of three address statements for Boolean expressions and flow of control statements . Show the three address statements for The statement i f((a>b ll a>c & & a != d) a=a+1; .	6

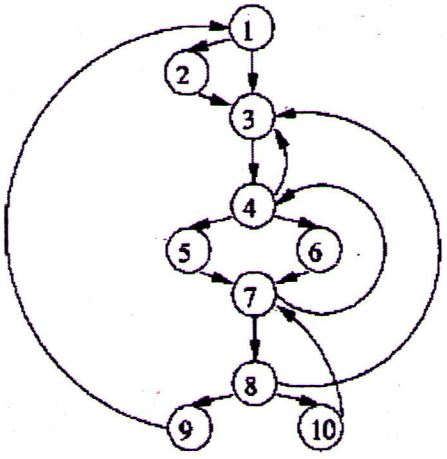
Q.no.	Module 3	Marks
3.a	Obtain the possible activation tree representing calls during the execution of the quicksort algorithm using the following input. Explain it. 2,1,8,4,9,3,5,7,10,6	3
	Answer b or c	
b	Write and explain the Baker's mark and sweep algorithm	6
c	Write and explain an algorithm for garbage collection based on the following. We have enough memory space to partition it in to two halves , with one for the allocated objects and the other kept free on a turn basis	6

Q.no.	Module 4	Marks
4.a	Explain tree translation scheme for code generation with the help of a suitable example.	3
	Answer b or c	
b	Obtain a tree translation scheme for the assignment statement A[i]=b[j]+5. Use prefix representation of the tree for the corresponding syntax directed translation scheme and generate the code	6
c	For the following C assignment statement y=(a-b)*(a-c)+(a-c) obtain three-address statements . Apply the code generation algorithm and generate the instructions. Show the changes in the register and address descriptors. Assume that only 3 registers are available .	6

Q.no.	Module 5	Marks
5.a	(i)Explain live variables with suitable examples. (ii) Explain available expression with suitable examples	4
	Answer b or c	
b	Write the reaching definition algorithm . Compute reaching definitions for the flow graph shown below	8



c What are dominators? Write the algorithm for the computation of dominators. Apply the algorithm in the following flow graph and find dominators — 8



Q.no.	Module 6	Marks
6.a	Explain loop unrolling and its necessity to achieve parallelism . Show how to unroll the generic loop for(i=0;i<N;i++) x[i]=x[i]+1;	4

Answer b or c

b Write the region based global scheduling algorithm and explain it using suitable examples. — 8

c Write a list scheduling algorithm for scheduling a basic block and explain it using suitable examples — 8