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#### B.TECH. (SEM I) THEORY EXAMINATION 2018-19 PROGRAMMING FOR PROBLEM SOLVING

Time: 3 Hours Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

#### **SECTION A**

#### 1. Attempt all questions in brief.

 $2 \times 10 = 20$ 

Qn.	Question	Marks	CO
a.	What is the difference between compiler and Interpreter?	2	CO1
b.	What are the good characteristics of an algorithm?	2	CO1
c.	What do you mean by scope and lifetime of a variable?	2	CO1
d.	Write a recursive function in C, which takes an input from user to calculate a factorial using the recursion concept.	2	CO3
e.	How to use break statement in C? Explain with some sort of code.	2	CO3
f.	What do you mean by precedence and associativity while solving some arithmetic expressions?	2	CO1
g.	While compiling a code, write the name of two syntax and two logical errors.	2	CO2
h.	What is an array? In which situation array is advantageous over linked list?	2	CO5
i.	What is linked list? Write the self-referential structure of a node in linked list?	2	CO5
j.	Write the difference between structure and union.	2	CO5
k.	Draw the memory hierarchical structure of computer system.	2	CO1

#### **SECTION B**

## 2. Attempt any three of the following:

a.	Explain linear search and binary search technique for searching an item	10	CO4
	in a given array. Also write the complexity for each searching technique.		
b.	A certain grade of steel is graded according to the following conditions:	10	CO3
	i. Hardness must be greater than 50		
	ii. Carbon content must be less than 0.7.		
	iii. Tensile strength must be less than 5600		
	The grades are as follows:		
	Grade is 10 if all the three conditions are met.		
	Grade is 9 if condition (i) and (ii) are met		
	Grade is 8 if condition (ii) and (iii) are met		
	Grade is 7 if condition (i) and (iii) are met		
	Grade is 6 if only one condition is met.		
	Grade is 5 if none of the conditions are met.		
	Write a program, which will require the user to give values of hardness,		
	carbon content and tensile strength of the steel under consideration and		
	output the grade of the steel.		

c.	What do you mean by call by value and call by reference? Write an	10	CO5
	algorithm for swapping two numbers using call by reference technique.		
	Also write a C program for the above stated algorithm.		
d.	Explain Selection sort technique for sorting problem. Also write an	10	CO2
	algorithm for selection sort. Sort the following numbers using selection		
	sort technique. 26,54,93,17,77,31,44,55,20		
e.	Write a short note on following preprocessor directives with example:	10	CO5
	i. Macro Expansion ii. File Inclusion		

### **SECTION C**

## 3. Attempt any *one* part of the following:

a.	Describe the basic components of computer system with neat and clean	10	CO1
	block diagram. What do you mean by operating system? Ex		
b.	Defined data types in C. Discuss primitive data types in terms of	10	CO1
	memory occupied, format specifier and range.		

### 4. Attempt any *one* part of the following:

a.	Explain various types of arithmetic operators in C language with help of	10	CO1
	example. When precedence of two operators in an arithmetic expression		
	is same, how associativity helps in identifying which operator will be		
	evaluated first. Illustrate it with the example.		
b.	What is case control structure in C.? What is the reason for using break	10	CO1
	statement at the end of each case in case control block?		

# 5. Attempt any one part of the following:

Qn.	Question	Mark	CO
	$\lambda$	S	
a.	Write the syntax format for while, do while and for loops. Write a	10	CO3
	program in C to multiply a matrix of dimension 4*4 and store the result		
	in another matrix.		
b.	What is a function? Why programmers use functions in code? While	10	CO4
	executing a function, how the values are passed between calling and		
	called environment?		

# 6. Attempt any *one* part of the following:

a.	Write short notes on following.	10	CO5
	1. Enumerated Data Type		
	2. String		
b.	What do you mean by order of complexity? Explain various notions to	10	CO2
	represent order of complexity with diagram		

## 7. Attempt any *one* part of the following:

a.	What is dynamic memory allocation? Explain the calloc(), malloc(),	10	CO5
	realloc() and free() functions in detail. What is lifetime of a variable,		
	which is created dynamically?		
b.	Explain command line arguments in C with the help of example.	10	CO5