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Question Paper Code: 52809

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Information Technology

15UIT209 - PROBLEM SOLVING AND PROGRAMMING TECHNIQUES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Which is an incorrect variable name? CO1- R
(a) Id No (b) ID_NO (c) Id_NO (d) idno
- What is the following function determining? CO1- R
intfn(int a, int b)
{
if (b ==0) return 0;
if (b == 1) return a;
return a + fn(a, b-1);
}
(a) a+b where a and b are integers (b) a+b where a and b are non-integers
(c) a*b where a and b are integers (d) a*b where a and b are non-integers
- Regarding the scope of the variables identify the incorrect statement: CO2- R
(a) Automatic variables are automatically initialized to 0
(b) Static variables are automatically initialized to 0
(c) The address of a register variable is not accessible
(d) static variable cannot be initialized with any expression.

4. What is the output of the following code? CO2- R
- ```
main()
{
static int num = 8;
printf("%d", num = num-2);
if(num!=0)
main();
}

```
- (a) 8 6 4 2 (b) infinite output  
(c) 6 4 2 0 (d) invalid because main function cannot call itself.
5. For the following definition, which of the given option is correct? `int a[10];` CO3- R
- (a) `a++`; (b) `a = a+1` (c) `*a++` (d) `*a[1]`
6. Give `float *pf; int *pi;` which of the following is true? CO3- R
- (a) `sizeof(pf) > sizeof(pi)` (b) `sizeof(pf) < sizeof(pi)`  
(c) `sizeof(pf) == sizeof(pi)` (d) none of these above
7. What is the return value of `getc()`? CO4- R
- (a) The next character from the stream is not referred by file pointer  
(b) EOF for end of file or error  
(c) Nothing  
(d) None of the mentioned
8. What are the first and second arguments of `fopen`? CO4- R
- (a) A character string containing the name of the file & the second argument is the mode  
(b) A character string containing the name of the user & the second argument is the mode  
(c) A character string containing file pointer & the second argument is the mode  
(d) None of the mentioned
9. What is the advantage of bubble sort over other sorting techniques? CO5- R
- (a) It is faster (b) Consumes less memory  
(c) Detects whether the input is already sorted (d) All of the mentioned
10. QuickSort can be categorized into which of the following? CO5- R
- (a) Brute Force technique (b) Divide and conquer  
(c) Greedy algorithm (d) Dynamic programming

PART – B (5 x 2= 10 Marks)

11. Enumerate the rules that apply to a function call. CO1- R
12. What is Extern? Write the syntax of “Extern”. CO2- R
13. Explain the effects of the following statement: CO3- R
- a) `double (*f) ();`
  - b) `a = ((float*) &x)`
14. In #include directives, some file names are enclosed in angle brackets while others are enclosed in double quotation marks. Why? CO4- R
15. Define Merge sort. What is the running time of Merge Sort? CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) (i) Explain about Call-by-value with an example. CO1- U (8)
- (ii) Explain about Call-by-reference with an example. CO1- U (8)

Or

- (b) The Fibonacci numbers are defined recursively as follows: CO1- U (16)
- $$F_1 = 1, F_2 = 1, F_n = F_{n-1} + F_{n-2}, n > 2$$

Write a function that will generate and print the first n Fibonacci number.

17. (a) Explain the various storage classes with suitable example CO2- U (16)

Or

- (b) (i) Write a program using pointers to read in an array of integers and print its elements in reverse order. CO2- U (8)
- (ii) Write a function (using pointer parameters) that reverses the elements of a given array. CO2- U (8)

18. (a) Explain the following with example programs. CO3- U (16)
- (i) Pointer to pointer
  - (ii) Pointer and array

Or

- (b) (i) Write a program to illustrate the use of pointers in arithmetic operation. CO3- U (8)
- (ii) Write a program that uses a function pointer as a function argument. CO3- U (8)

19. (a) Describe the formatted input and output statement with suitable example. CO4- U (16)
- Or
- (b) (i) Write a program to copy the contents of one file into another. CO4- App (6)
- (ii) Write a program to read data from the keyboard, write it to a file called input, again read the same data from the input file, and display it on the screen. CO4- App (10)
20. (a) Describe the quick sort algorithm and sort the following elements: CO5- U (16)
- 26, 18, 42, 14, 36, 64, 6, 58, 17, 65, 82, 12
- Or
- (b) (i) Write the procedure of heap sort. Give an example. CO5- U (10)
- (ii) How does heap sort is better than other sorting algorithms for large number of given elements? CO5- U (6)