

ID No.:

Lab. Sec.:

Name:

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI,
K. K. BIRLA GOA CAMPUS, Second Semester 2017-2018**

Course Title : COMPUTER PROGRAMMING

Course No: CS F111

Component : MID SEMESTER TEST (REGULAR)

Mode: CLOSED BOOK

Weightage : 20%

Max Marks: 60

Date: 07TH MARCH 2018

Question #1

[3 + 4 + 1 + 3 + 3 + 3 = 17 Marks]

[I]. Write commands to: (A) Create an object file named merge_sort.o (B) Create executable named SORT from merge_sort.o. (C) Execute SORT by taking input from sort_input.txt and store output into sort_output.txt.

(A)	
(B)	
(C)	

[II]. What will be the evaluation sequence in C when the following expression is evaluated? $b = ++x * y-- + --z / a++;$

(1)	(2)	(3)	(4)
(5)	(6)	(7)	(8)

```
int a; double b;
```

```
printf("%d",scanf("%d %d %lf %d %d",&a,&a,&b,&a,&a));
```

[III]. If the user input is 2 3 4.5 6y 9 what will be the output?

--

[IV]. What will be the output of the following code snippet?

```
printf("%d",printf("\nYour work\b\r\Test\nMid Sem'\n"));
```

--

Answer [V] and [VI] in backside of this sheet.

[V]. What are the 6 stages of building software solution?

[VI]. Define Dijkstra's principle of representation

Question #2**[3 + 2 + 3 + 20 = 28 Marks]**

[I]. Assume a floating point format with 1 bit for sign, 5 bits for biased exponent and 10 bits for fraction.

(A) What will be the smallest representable positive number?

(B) Represent the number -1.75×2^{-10} in this format.

(A)

(B)

[II]. In switch case construct, the last comparison takes place with the first case. TRUE / FALSE? Justify your answer.

```
for(i=0, j=1000; i<=j; i++, j--) { Loop body }
```

[III]. How many times initialization, condition check and increment/decrement part of this for loop execute?

initialization:

condition check:

increment/decrement:

[IV]. Write a C program which takes **Sign (S)**, **Biased exponent (bExp)** and **Fraction (frac)** as input from the user. **S** should be declared as character with value **'0'** representing positive number and value **'1'** representing negative number. **bExp** should be declared as **unsigned short int** and it takes the decimal equivalent of **Biased exponent**. **frac** should be declared as **int** and it takes the decimal equivalent of **Fraction**. In single precision floating point representation, frac will be always less than 2^{24} . The program should validate each input based on **Normalized single precision floating point value**. The program should construct the floating point equivalent from **S**, **bExp** and **frac** and display it with the width and precision specified by the user [keep on taking width and precision from user until width \geq (precision + 2)]. Note: Indentation carries mark. Inputs can be entered with arbitrary number of white spaces. You need to take care of white spaces while taking input.

The final number should be:

if (sign is '0') $(1.0 + \text{Fraction} / 2^{24}) \times 2^{(\text{biasedExp} - 127)}$

if (sign is '1') $-1 \times ((1.0 + \text{Fraction} / 2^{24}) \times 2^{(\text{biasedExp} - 127)})$

$2^{24} = 16 \times 1024 \times 1024 = 16777216$

$2^{(\text{biasedExp} - 127)}$ has to be computed using X^Y mechanism where $X=2$ and $Y = (\text{biasedExp} - 127)$.

If $Y = 13$, X^Y should be $2^1 \times 2^4 \times 2^8$ [Use left shift and bitwise AND for achieving the same]. Make sure the iteration ends with the Most Significant bit of Y with value 1].

Question #3**[2 + 2 + 2 + 2 + 2 + 2 + 3 = 15 Marks]**

[I]. In the following code snippet which variable(s) (including arrays) give temporal locality and which variable(s) (including arrays) give spatial locality?

```
for(var1=0, Z=50; var1<Z; var1++) { x[var1]+=5; y[Z]+=1; }
```

Temporal:

Spatial:

[II]. (A) What are the different types of multi-vibrators available? (B) Which one of these is used as memory?

(A)

(B)

[III]. $(F9.4)_{16}$ is a hexa-decimal number represented in 2's complement form. Find its decimal value

[IV]. Static branch prediction rule for forward branch is ____

[V]. Write an example for dangling else.

[VI]. When overflow happens in floating point operations?

[VII]. What will be the output of the following code snippet?

```
int a,b,c; a=10; b=20; c=50;
if((a = 100) && (c = 0) && (b = 200)) b *= 100; else b += 300;
printf("a = %d\t\t\t b = %d\t\t\t c = %d\n",a,b,c);
```

a =

b =

c =