19 CSE 102 Computer Programming

LAB 2 - PART 1- OPERATORS AND DECISION MAKING

1. Find the output of the following program

```c
#include <stdio.h>
int main()
{
    int a = 10, b = 4;
    // greater than example
    if (a > b)
        printf("a is greater than b\n");
    else
        printf("a is less than or equal to b\n");
    // not equal to
    if (a != b)
        printf("a is not equal to b\n");
    else
        printf("a is equal b\n");
    return 0;
}
```

2. Find the output of the following program

```c
#include <stdio.h>
int main()
{
    int a = 10, b = 4, c = 10, d = 20;
    if (a > b && c == d)
        printf("a is greater than b AND c is equal to d\n");
    else
        printf("AND condition not satisfied\n");
    if (a > b || c == d)
        printf("a is greater than b OR c is equal to d\n");
    else
        printf("Neither a is greater than b nor c is equal "
               " to d\n");
    if (!a)
        printf("a is zero\n");
    else
        printf("a is not zero");
    return 0;
}
```

3. Find the output of the following program and explain the reason leading to the output

```c
#include<stdio.h>
int main()
{
    int a = 10, b = 4;
    int res = ((a == b) && printf("Namaste"));
    printf("%d",res);
    return 0;
}
```

4. Find the output of the following program and explain the reason leading to the output

```c
#include<stdio.h>
int main()
{
    int a = 10, b = 4;
    int res = ((a != b) && printf("Namaste\n"));
    printf("%d",res);
    return 0;
}
```

5. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int a = 10, b = 4;
    int res = ((a != b) || printf("Namaste\n"));
    printf("%d",res);
    return 0;
}
```

6. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int a = 10, b = 10;
    int res = ((a != b) || printf("Namaste\n"));
    printf("%d",res);
    return 0;
}
```

7. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
  int a = 10, b = 20, c = 30;
  if (c > b > a)
    printf("TRUE");
  else
    printf("FALSE");
  return 0;
}
```

8. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
  int a = 10, b = 20;
  printf("%d\n",a<<1);
  printf("%d",b<<2);
  return 0;
}
```

9. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
   int a = 10, b = 20;
   printf("%d\n",a>>1);
   printf("%d",b>>2);
   return 0;
}
```

10. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
   int a = 10;
   char b = 'a';
   printf("%d\n",sizeof(a));
   printf("%d\n",sizeof(b));
   printf("%d",sizeof(printf("Himalayas")));
   return 0;
}
```

11. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
   int a = 10, b = 10;
   printf("%d\n",a++);
   printf("%d\n",a);
   printf("%d\n",++b);
   printf("%d",b);
   return 0;
}
```

12. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int a = 1;
    int b = 1;
    int c = a || --b;
    int d = a-- && --b;
    printf("a = %d, b = %d, c = %d, d = %d", a, b, c, d);
    return 0;
}
```

13. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
     printf("%d", 1 << 2 + 2 << 4);
     return 0;
}
```

14. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int i = 12;
    int j = sizeof(i++);
    printf("%d\n%d", i, j);
    return 0;
}
```

15. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int i = 4;
    int j = 5;
    printf("%d\n",i^j);
    printf("%d",i^(--j));
    return 0;
}
```

16. Find the output of the following program and explain the reason leading to the output

```c
#include<stdio.h>
int main()
{
  int a = 2,b = 5;
  a = a^b;
  b = b^a;
  printf("%d\n%d",a,b);
  return 0;
}
```

17. Given the code to swap two variables without a third variable using + and – operators. Can you try to write a code to swap variables without using a third variable using the ^ operator.

18. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
   int a = 0;
   int b;
   a = (a == (a == 1));
   printf("%d", a);
   return 0;
}
```

19. Find the output of the following program and explain the reason leading to the output

```c
#include <stdio.h>
int main()
{
    int i = 0, j = 1, k = -1;
    float a;
    float x = 0.5, y = 0.0;
    a =  x * y < i + j || k  ;
    printf("%f", a);
    return 0;
}
```

20. Which BITWISE operator is to be used in line number 7 for the value in variable ‘c’ to be 6? What is the value in variable ‘z’?

```c
#include <stdio.h>
int main()
{
    int x = 4;
    int y = 6;
    int z = x&y;
    int c = x y;
    printf("%d\n%d",z,c);
    return 0;
}
```

21. Akshay and Rohith are playing a game. The game is such that Akshay has to find out the number in a series of 5 numbers which are given by Rohith (all the numbers are greater than 0). Now, out of the 5 numbers only one number is not a duplicate of any other number, i.e every other number except one number has a duplicate. Help Akshay write a program that finds the number not having a duplicate and displays the same as the output. [Please understand that you are not supposed to use == operator or loops or an array(s) or any built in function other than printf and scanf)]

    Input
    4
    6
    10
    4
    6
    Output
    10

22. Nivedita and Hima are playing a game to determine whether a number mentioned by Hima is even or odd. However, Nivedita is not supposed to use /, %, - or + operators. Help Nivedita to write a program that can determine whether the number mentioned by Hima is even or odd

    Input
    4
    Output
    Even

23. Find the output of the following program and explain the reason leading to the output

```c
#include<stdio.h>
int main()
{
    int a = 7, b = 4, c = 2;
    printf("%d\n", a|b&c);
    return 0;
}
```