Week 3: Assignment Solution Jan 2023

1. What should be the value of ‘b’ such that the output of the program will be 20?
   (<< indicates bitwise left shift operator)

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

   a) 1
   b) 2
   c) 3
   d) 4

   Solution: (b) a<<b indicates ‘a’ is left shifted by ‘b’ units. If ‘b=2’, then a<<b becomes 10100 which is 20 in decimal.

2. Find the output of the following C code

```
#include <stdio.h>
int main()
{
   int x=1;
   if ((3>5) || (2!=3))
      printf("IITKGP\n");
   else if (x&=0)
      printf("IITD\n");
   else
      printf("IITM\n");
    return 0;
}
```

   a) IITKGP
   b) IITD and IITM
   c) IITKGP and IITM
   d) IITM

Solution: (a) Only the first if condition will be executed as the condition inside the if statement is true. Thus IITKGP will be printed.

3. What is the output of the following program?

```
#include<stdio.h>
int main()
{
   int i;
   if(i=0,2,3)
      printf("NPTEL ");
   else
      printf("Programming on C ");
   printf("%d\n", i);
}
```

   a) Programming on C 0

b) NPTEL 0
c) NPTEL 3
d) Compilation error

Solution: (b) At first zero will assign in 'i' then comma operator returns the last value which is 3 and condition becomes true.

4. Find the output of the following C code

```
#include<stdio.h>
int main()
{
   int a=10, b=3, c=2, d=4, result;
   result=a+a*-b/c%d+c*d;
   printf("%d", result);
  return 0;
}
```

a) -42
b) 24
c) 15
d) -34

Solution: (c) Following the precedence rule, we can conclude that the operation steps are

- ➔ Result=10+10*- 3/2%4+2*4
- ➔ Result=10-30/2%4+2*4
- ➔ Result=10-15%4+2*4
- ➔ Result=10-3+2*4
- ➔ Result=10-3+8
- ➔ Result=7+8
- ➔ Result=15

5. Which of the following statement is correct?
   a) Operator precedence determines which operator is performed first in an expression with more than one operator with different precedence. Associativity is used when two operators of same precedence appear in an expression
   b) Operator associativity determines which operator is performed first in an expression with more than one operator with different associativity. Precedence is used when two operators of same precedence appear in an expression
   c) Operator precedence and associativity are same.
   d) None of the above

Solution: (a) Operator precedence determines which operator is performed first in an expression with more than one operator with different precedence, whereas associativity is used when two operators of same precedence appear in an expression

6. What is the output of the C program given below?

```
#include <stdio.h>
int main()
{
   int x = 0;
      if (x++)
         printf("true\n");
   else if (x == 1)
      printf("false\n");
   return 0;
}
```

a) true
b) false
c) Compiler dependent
d) Compiler error

Solution: (b) ++ is a post increment operator. In x++, first 0 will be assigned and then x will be incremented by 1. Thus the next else if condition will be evaluated and false will be printed.

7. What is the output of the following program?

```
#include<stdio.h>
int main()
{
   int a=10, b=3, c;
   float d;
   c=a%b;
   d=a/b;
   printf("Value of c and d are %d and %f respectively", c, d);
   return 0;
}
```

a) Value of c and d are 1 and 3 respectively
b) Value of c and d are 1 and 3.333333 respectively
c) Value of c and d are 1.000000 and 3.000000 respectively
d) Value of c and d are 1 and 3.000000 respectively

Solution: (d)

8. What will be the output?

```
#include <stdio.h>
int main()
{
   int a = 100, b = 200, c = 300;
   if (c > b > a)
         printf("TRUE");
   else
         printf("FALSE");
   return 0;
}
```

a) TRUE
b) FALSE
c) Syntax Error

d) Compilation Error

Solution: (b) FALSE :: (c > b > a) is treated as ((c > b) > a), associativity of '>' is left to right. Therefore the value becomes ((300 > 200) > 100) which becomes (1 > 100) thus FALSE

9. What will be the output?

```
#include<stdio.h>
int main()
{
 int x;
 x= 9<5+3 && 7;
 printf("%d", x);
 return 0;
}
```

a) 0
b) 1
c) 7
d) Compilation error

Solution: (a) 0

This expression is equivalent to:

((9< (5 + 3)) && 7)
i.e., (5 + 3) executes first resulting into 8
then, first part of the expression (9 < 8) executes resulting into 0 (FALSE)
Then, (0 && 7) executes resulting into 0 (FALSE)

10. The precedence of arithmetic operators is (from highest to lowest)
    a) %, *, /, +, –
    b) %, +, /, *, –
    c) +, -, %, *, /
    d) %, +, -, *, /

Solution: (a) The precedence order follows the first option (a)

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