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MINOR ASSIGNMENT-02

Practical Programming with C (CSE 3544)

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Course Outcome: CO_1 **Program Outcome:** PO_1 **Learning Level:** L_4

Problem Statement:

Experiment with selection and repetition control structure in programming.

1. Find and explain the output of the following code snippet:

```
#include<stdio.h>
int main(){
  float x = 25.0, y=10.0;
  if(y != (x - 10.0))
    x = x - 10.0;
  else
    x = x / 2.0;
  return 0;
}
```

Expected value of x with explanation

x - 10.0 = 15.0 , y = 10.0 , condition is true.

∴ x = 15.0

2. Find and explain the output of the following code snippet:

```
int main(){
  float x = 25.0, y=10.0;
  if(y < 15.0)
    if(y >= 0.0)
      x = 5 * y;
    else
      x = 2 * y;
  else
    x = 3 * y;
  return 0;
}
```

Expected value of x with explanation

y<15.0 → true and y>=0.0 → true

So x = 5 * y = 50.0

∴ x = 50.0

3. Find the output of the following code snippet:

```
int main(){
  int i=2;
  switch(i) {
    default: printf("Hello ");
    case 1: printf("Hello ");
    case 2:
    case 3: printf("Hello ");
  }
  return(0);
}
```

Output here with brief explanation

Since no break is used, execution falls through after matching case 2.

Output: Hello

4. Consider the following code snippet and state your answer.

```
int main(){
  int i = 0;
  while (i <= 5) {
    printf("%3d %3d\n",
                  i, 10 - i);
    i = i + 1;
  }
  return 0;
}
```

Answer here

0 10
1 9
2 8
3 7
4 6
5 5

5. State whether the given code snippet will run or not. If so, state the reason

```
int main(){
  int i=1;
  while ( ){
    printf("%d", i++);
    if(i>10)
      break ;
  }
  return 0;
}
```

Run or not with reason

Condition inside while loop is missing and will raise Syntax error.
∴ Program will not run.

6. Mention the output at the **`printf`** line.

```
int main() {
 int i, j,n=5;
 for(i=1,j=1; j<= n;i+= 2, j++)
 {
   printf("%d%d\n", i, j);
  }
  return 0;
}
```

Output at printf

11
33
55
77
99

7. Write the output.

```
int main()
{
 int count=6;
 while (--count+1);
   printf("count down is %d\n",count);
 return 0;
}
```

Expected value of count

count down is -1

8. State how many times the nested loop will be executed and also the output.

```
int main()
{
  int m, n;
  for (m = 3; m > 0; --m){
    for (n = 2; n > 1; --n)
      printf("#########\n");
  }
  return 0;
}
```

#times and output

Total executions = 3x1 = 3 times.

#####
#########
#########

9. The following code snippet uses a keyword **break**. Evaluate the desired output.

```
int main() {
  int i = 0 ;
  while(i++) {
    printf("%d ",i);
    if (i > 2)
      break ;
  }
  return ( 0);
}
```

Output

No Output, the loop never executes.

10. The code snippet uses the operator **sizeof()**. Find the output.

```
int main()
{
  int a = 10;
  if(a=0){
    printf("%ld %ld",sizeof(2.3f),sizeof(2.3));
  }
  return(0);
}
```

Output

No output as condition is false.

11. Write a program to calculate the grade of a student using **switch** case. The program should ask the user about the marks obtained by the student and find the grade according to following rule if $mark \geq 95$ the grade 'O', if $81 \leq mark \leq 94$ then grade 'A', if $71 \leq mark \leq 80$ then grade 'B', if $61 \leq mark \leq 70$ then grade 'C', if $51 \leq mark \leq 60$ then grade 'D', if $40 \leq mark \leq 50$ then grade 'E', if $mark < 40$ then grade 'F'.

Write program here

```
#include <stdio.h>
int main(){
int mark;
```

Write program here

```
printf("Enter marks obtained: ");
scanf("%d", &mark);
switch(mark/10){
   case 10:
   case 9: printf("Grade: O\n"); break;
   case 8: printf("Grade: A\n"); break;
   case 7: printf("Grade: B\n"); break;
   case 6: printf("Grade: C\n"); break;
   case 5: printf("Grade: D\n"); break;
   case 4: printf("Grade: E\n"); break;
   default: printf("Grade: F\n"); break;
 }
return 0;
}
```

12. The natural logarithm can be approximated by the following series

$$\frac{x-1}{x}+\frac{1}{2}\left(\frac{x-1}{x}\right)^2+\frac{1}{2}\left(\frac{x-1}{x}\right)^3+\frac{1}{2}\left(\frac{x-1}{x}\right)^4+\cdots$$

Write a program that accepts x as an input through the keyboard and calculates the sum of first nine terms of this series.

Write program here

```
#include <stdio.h>
#include <math.h>
int main()
{
 float x, term, sum=0;
 printf("Enter value of x: ");
 scanf("%f", &x);
 for(int i=1; i<=9; i++){
  term = pow((x-1)/x, i)/i;
  sum += term;
}
printf("Sum of first 9 terms = %.6f \n", sum);
return 0;
}
```

13. Design a C program to display the following pattern based on the input given by the user.

```
Enter the choice of the character : G

A B C D E F G F E D C B A
A B C D E F   F E D C B A
A B C D E       E D C B A
A B C D           D C B A
A B C               C B A
A B                   B A
A                       A
```

Write program here

```
# include <stdio.h>
int main(){
  char ch;
  printf("Enter the choice of the character: ");
  scanf("%c",&ch);
  int rows = ch - 'A' + 1;
  for(int i= rows; i>=1;i--){
  for(char j='A'; j<'A'+i;j++){
     printf("%c ",j);
  }
  int spaces = (rows - i) * 2;
  for(int k=0; k<spaces;k++){
    printf(" ");
  }
  for(char j='A'+i-1; j>='A';j--){
     printf("%c ",j);
  }
  printf("\n");
  }
  return 0;
}
```

14. Write a program to generate the multiplication table for a given number as follows

```
Enter the number > 8
+-------------------------------------------+
|   8  16  24  32  40  48  56  64  72  80 |
|   1   2   3   4   5   6   7   8   9  10 |
|   8   8   8   8   8   8   8   8   8   8 |
+-------------------------------------------+
```

Write program here

```
#include <stdio.h>
int main (){
  int n;
  printf("Enter the number > ");
  scanf("%d", &n);
  printf("+-------------------------------------------+\n");
  printf("| ");
  for(int i=1;i<=10;i++){
      printf("%4d ", n*i);
  }
  printf(" |\n");
  printf("| ");
  for(int i=1;i<=10;i++){
    printf("%4d ", i);
  }
  printf("|\n");
  printf("| ");
  for(int i=1;i<=10;i++){
    printf("%4d", n);
  }
  printf(" |\n");
  printf("+-------------------------------------------+\n");
  return 0;
}
```