Home Work No.9

Content:

1) Loops
2) Nested loops
3) Selected Problems from Past Papers

Run following programs in separate .cpp files and carefully understand the output.

……..code Segment 1 ……..

```
const int MIN_NUMBER = 1, MAX_NUMBER = 10;

    int num = MIN_NUMBER;


while (num <= MAX_NUMBER)
{
    cout << num << setw(10) << (num * num) << endl;
    num++;
    }
```

……..code Segment 2 ……..

```
    int i=10;
    while (i>0)
    {
        cout<<setw(i)<<"*"<<endl;
        i--;
    }
```

……..code Segment 3 ……..

```
    int i=5;

    while (i>0)
    {
        cout<<setw(i)<<"*"<<endl;
        i--;
    }
    while (i<4)
    {
```

```
                cout<<setw(i+2)<<"*"<<endl;
                i++;
        }
```

……..code Segment 4 ……..

```
int a = 0;
        while (a < 59)
        {
                if (a % 5 == 0)
                        cout << a << " ";
                a++;
        }
        cout << '\n';
```

Challenge1: rewrite above code by using for loop
Challenge2: rewrite above code by using continue statement with while loop
Challenge3: rewrite above code by using continue statement with for loop

What is wrong with the following code Segments? Explain.

……..code Segment 1 ……..

```
        int num1 = 0, num2 = 10, result;
        num1++;
        result = ++(num1 + num2);
        cout << num1 << " " << num2 << " " << result;
```

……..code Segment 2 ……..

```
        int num1 = 0;

        while (num1<=10)
                cout<<num1;
                num1++;
```

……..code Segment 3 ……..

```
        int num = 1;

        while ( )
        {
                cout<<num;
                num1++;
        }
```

……..code Segment 4 ……..

```
int num, bigNum, power, count;
cout << "Enter an integer: ";
cin >> num;
cout << "What power do you want it raised to? ";
cin >> power;
bigNum = num;
while (count++ < power);
        bigNum *= num;

cout << "The result is "<< bigNum << endl;
```

…….code Segment 5 ……..

```
int count = 1, total;
while (count <= 100)
        total += count;
cout << "The sum of the numbers 1-100 is ";
cout << total << endl;
```

1. Compile the following code segment and explain what logic of code is? Rewrite it with same logic without continue statement.

```
int x = 100;

    while (x > 0)
    {
        cout << "\nEnter a value:  ";
        cin >> x;
        if (x == 1)
        {
            x--;
            continue;
        }
        cout << "x = " << x << '\n';
    }
```

Challenge: Convert or rewrite above code using do-while loop.

// **PART 2** //

Reprogram codes with more efficient and clean logics.

1. Dry run following code segments and show the output.

…….code Segment -1 Sentinel 1 ……..

```
int points, sum=0;

cout<<"\nEnter a vlaue to sum OR -1 for Exit :  ";
cin>>points;
```

```
while(points != -1)
{
        sum += points;
        cout<<"\nEnter a vlaue to sum OR -1 for Exit :  ";
        cin>>points;
}
cout<<"\n Total Sum is = "<<sum;
```

Convert or rewrite above code using do-while loop.

…….code Segment-2 Sentinel 2 ……..

```
int value;

cout<<"\nEnter a vlaue in Range 1 to 1000 :  ";
cin>>value;

while(value <0 || value>1000)
{

    cout<<"\nEntered Value is not in range  "<<value<<"\nEntered another Value : ";
    cin>>value;
}
```

Convert or rewrite above code using do-while loop.

Do Practice setw( ) before doing code segments below. Do practice cout.fill( ).

…….code Segment-3 Pattern-1 Single loop……..

```
int i=10;


while (i>0)
{
        cout<<setw(i)<<left<<"*"<<setw(i)<<right<<"*";
        cout<<endl;
        i--;
}
```

Convert or rewrite above code using for loop.

…….code Segment-3A Pattern-1 Single loop……..

```
int i=10;
cout.fill('#');
```

```
while (i>0)
{
        cout<<setw(i)<<left<<"*"<<setw(i)<<right<<"*";
        cout<<endl;
        i--;
}
```

Convert or rewrite above code using for loop

…….code Segment-4 Pattern-2 Single loop ……..

```
int i=1;


while (i<=12)
{
        cout<<setw(i)<<left<<"*"<<setw(i)<<right<<"**";
        cout<<endl<<endl;
        i +=2;
}
```

Convert or rewrite above code using for loop

…….code Segment-5 Pattern-3 Single loop ……..

```
        int i=1;
        int j=10;

        while (i<10)
        {
                cout<<setw(j)<<"*"<<setw(i)<<"*";
                cout<<endl;
                i+=2;
                j--;
        }

        i=9;
        j++;
        while (i>0)
        {
                cout<<setw(j)<<"*"<<setw(i)<<"*";
                cout<<endl;
                i-=2;
                j++;
        }
```

Convert or rewrite above code using for loop

…….code Segment-5 Pattern-3A Single loop ……..

```
int i=1;
        int j=10;

        char ch = '#';
```

```
        cout.fill(ch);
        while (i<10)
        {
                cout<<setw(j)<<"*"<<setw(i)<<"*";
                cout<<endl;
                i+=2;
                j--;
        }

        i=9;
        j++;
        while (i>0)
        {
                cout<<setw(j)<<"*"<<setw(i)<<"*";
                cout<<endl;
                i-=2;
                j++;
        }
```

…….code Segment-6 Pattern-4 Single loop ……..

```
int i=6;
    int j=2;

    while (i>0)
    {
            cout<<setw(j)<<"*"<<setw(i)<<"*";
            cout<<endl;
            i-=2;
            j++;
    }

    i=2;
    j=4;

    while (i<8)
    {
            cout<<setw(j)<<"*"<<setw(i)<<"*";
            cout<<endl;
            i+=2;
            j--;
    }
```

Convert or rewrite above code using for loop

…….code Segment-7 Pattern-4 nested loop ……..

```
int counter = 0;
    int i, j;

    while (counter<=9)
    {
            if (counter %2 ==0)
            {
```

```
                i=6;
                j=2;

                while (i>0)
                {
                        cout<<setw(j)<<"*"<<setw(i)<<"*";
                        cout<<endl;
                        i-=2;
                        j++;
                }
                counter ++;
        }
        else
        {

                i=2;
                j=4;

                while (i<8)
                {
                        cout<<setw(j)<<"*"<<setw(i)<<"*";
                        cout<<endl;
                        i+=2;
                        j--;
                }
                counter ++;
        }
}
```

// ***PART 3*** //

…… code Segment-8 Nesting ……..

```
        int a=1;
        int b=1;

        while(a<=6)
        {
                b=1;
                while(b<=a)
                {
                        cout<<"*";
                        b++;
                }
                cout<<endl;
                a++;
        }
        while(a>=1)
        {
                b=1;
                while(b<=a)
                {
```

```
            cout<<"*";
            b++;
        }
        cout<<endl;
        a--;
    }
```

Convert or rewrite above code using for loop

……code Segment ……..

```
int a=6;
int b=1;
int c=1;

while(a>=1)
{
        b=1;
        while(b<a)
        {
                cout<<"-";
                b++;
        }
        c=1;
        while(c<=7-a)
        {
                cout<<"*";
                c++;
        }
        cout<<endl;
        a--;
}

 a=6;
 b=1;
 c=1;


while(a>=1)
{
        b=1;
        while(b<8-a)
        {
                cout<<"-";
                b++;
        }
        c=1;
        while(c<a)
        {
                cout<<"*";
                c++;
        }
```

```
                cout<<endl;
                a--;
        }
```

Challenge: ***what is wrong in above code? Correct it.***
Convert or rewrite above code using for loop

…….code Segment ……..

```
int a=6;
        int b=1;
        int c=1;

        while(a>=1)
        {
                b=1;
                while(b<a)
                {
                        cout<<"-";
                        b++;
                }
                c=1;
                while(c<=7-a)
                {
                        cout<<c;
                        c++;
                }
                cout<<endl;
                a--;
        }

         a=6;
         b=1;
         c=1;


        while(a>=1)
        {
                b=1;
                while(b<8-a)
                {
                        cout<<"-";
                        b++;
                }
                c=1;
                while(c<a)
                {
                        cout<<c;
                        c++;
                }
                cout<<endl;
                a--;
```

```
}
```

***Challenge:* what is wrong in above code? Correct it.**
Convert or rewrite above code using for loop

//

Selected Questions from Previous papers:

Write the outputs following codes:

`int main()`
`{`
`  int i;`
`  for (i = 0, i++; i <= 2; i = 0, i += 3)`
`  cout << i;`
`return 0;`
`}`
	Output:

`int main()`
`{`
`  int choice = 5;`
`  switch (choice) {`
`  default:`
`  cout << "\nI am in Default";`
`  case 1:`
`  cout << "\nI am in case 1";`
`  break;`
`  case 2:`
`  cout << "\nI am in case 2";`
`  break;`
`  case 3:`
`  cout << "\nI am in case 3";`
`  break;`
`  }`
`return 0;`
`}`
	Output:

`int main()`
`{`
`  float num1 = 1.1;`
`  double num2 = 1.1;`
`  if (num1 == num2)`
`  cout << "Stanford";`
`  else`
`  cout << "Islamabad";`
 	
`return 0;`
`}`
	Output:

```
int main()
{
     int y = 0;

     switch (y){

     case 0:  y = y + 5;

     case 1:  y = y / 2;
     case 2:  y = y * 3;
     case 3:  y = y + 10;

     default: y = y%3;

     }
     cout << y << endl;
return 0;
}
```

Output:

```
int main()
{
     int i = 5, j = 3, k = 4;
     if (i % j + i < k) {
          cout<< (k > i < j);
     }
     else {
     cout<< (i < j == j < k);
     }

return 0;
}
```

Output:

```
int main()
{
     int i = 3, j = 3, k = 3;
     if (--i - 7 && j++ < ++k)
          cout<< ++i;
     else
          cout<< i<< j<< k;
return 0;
}
```

Output:

```
int main()
{
     int n = 5;
     while (n >= 0)
     {
          cout << --n * n++ << endl;
```

Output:

```
          n--;
     }
     while (n > 0)
          cout << (n /= 2) << endl;

return 0;
}
```

```
int i = 0, j = 0;
(i++)++;
++(j++);
cout << i << endl;
cout << j << endl;
```

```
int i = 7, j=12, k=15, l = 8, m =0 , n =
10, o = 30;
double p = 19.5;
cout << !((i / j / k) - (l * m * n) + (p
< o - n));
```

```
int a,b,c,d;
a=b=c=d=20;
a+=b-=c*=d/=20;
cout << a << " " << b << " " << c << " "
<< d << endl;
```

```
int x=5,y=10,z=2;
z *= (++y) / 5;
cout << z;
```

```
int i = 5;
cout << (i = 5 ? 4 : 3 ? 2 : 1);
```

```
const int size;
size = 10;
size += 10>5;
size -= 10<5;
cout << size;
```

```
int i = 2, j = 2;
while (i + 1 ? --i : j++)
    cout<<" " << i;
```

```
int y = 10;
if (y++ > 9 && y++ != 11 && y++ > 11)
     cout << y;
else
     cout << y;
```

```
int i = 0, j = 1, k = 2, m;
m = ++i || j++ || k++;
cout << m << " " << i << " " << j << " "
<< k ;
```

```
int a, b = 10;
a = -b--;
cout << a << " " << b;
```

```
unsigned char i=0;
for(; i >= 0; i++);
     cout <<  static_cast<int>(i) <<
"\n";
```

```
char a = 30, b = 40, c = 10;
char d = (a*b)/c;
cout << static_cast<int>(d);
```

```
unsigned int i=1;
while(i-- >= 0)
     cout << i;
```

```
int i=0;
while ( +(+i--) != 0)
     i-=i++;
     cout << i;
```

```
int i=0;
for(i=0; i<30; i++)
{
     switch(i)
     {
          case 0:
          i+=5;
          case 1:
          i+=2;
          case 5:
          i+=5;
          default:
          i+=4;
          break;
     }
     cout << i << " ";
}
```

```
int a;
int b = 1;
int x[5] = { 1, 2, 3, 4, 5 };
a = 5 * 4 + x[--b] - (9 / b);
```

`cout << a;`	

f) Clearly mention error(s) in the following codes.

`int main()`
`{`
 	
`int y = 0, x = 1;`
`if (y != 0);`
`{`
`  if (x != 0);`
`  result = x / y;`
`}`
`else {`
`  cout<< Error: y is equal to zero\n ;`
`}`
`return 0;`
`}`
	Error:

`int main()`
`{`
`int num1 = 0, num2 = 10, result;`
`num1++;`
`result = ++(num1 + num2);`
`cout << num1 << " " << num2 << " " << result;`
`return 0;`
`}`
	Error:

`int main()`
`{`
`int count = 1, total;`
`while (count <= 100)`
`total += count;`
`cout << "The sum of the numbers 1-100 is ";`
`cout << total << endl;`
`return 0;`
`}`
	Error:

g) Consider the following code below:

```
int main()

{

int n = 6, x = 2, i = 0;

  while (i <= n)
  {
     if (i%2==1)
          x = x + pow(2,i) *
i;
     i++;
     cout << x <<"-";
 }


return 0;

}
```

1) <u>Dry Run the code</u>

2) <u>Output of code</u>

3) Convert the above code using for loop:

Write the output of the following programs (if any). If there is an error in the program, correct the code and then write the output.

`int main(){`
`  int i = 0, x = 0;`
`  do`
`  {`
`  if(i % 5 == 0)`
`  {`
`  cout<<x;`
`  x++;`
`  }`
`  ++i;`
`  }while(i<10);`
`  cout<<x;`
`  return 0;`
`}`	

`int K = 5;`
`int I = -2;`
`while (I <= K){`
`  I = I + 2;--K;`
`  cout << (I + K) << endl;`
`}`	

`int main(){`
`  char i = 0;`
`  for (; i++; cout<<int(i));`
`  cout<<int(i);`
`  return 0;`
`}`	

`int main(){`
`  int count = 0;`
`  for (;;) {`
`  if (count == 10)`
`  break;`
`  cout<<++count;`
`  }`
`  return 0;`
`}`	

`int main(){`
`  int count;`
`  for(count = 0;count<10;++count){`
`  cout<<"#";`
`  if (count > 6)`
`  continue;`	

`        cout<<count;`
`    }`
`    return 0;`
`}`	

`int main(){`
`    int loopvar = 5;`
`    while (cout<<"Hello " && loopvar--);`
`    return 0;`
`}`	

`int main(){`
`    int i, j, var = 'A';`
`    for (i = 5; i >= 1; i--) {`
`        for (j = 0; j < i; j++)`
`            cout<<char (i+var + j);`
`        cout<<endl;`
`    }`
`    return 0;`
`}`	