



Attempt **all** of the following questions

**Question 1:**

(10 Marks)

Determine the output for each of the following code snippets (assuming successful compilation):

<p>a- (5 Marks)</p> <pre>for (int i = 0; i &lt; 5; i++) {   for (int j = 0; j &lt; 5; j++) {     char c;     switch (abs(i - j)) {       case 0 : c = '\\'; break;       case 2 : c = '+'; break;       case 4 : c = '!'; break;       default: c = ' '; break;     }     cout &lt;&lt; c;   }   cout &lt;&lt; endl;}</pre> <p><b>Solution:</b></p> <pre>\ + \ + + \ + + \ . + \ </pre>	<p>b- (5 Marks)</p> <pre>for (int i = 5; i &lt;= 10; ++i) {   if ( i == 7    i == 9) {     continue;   }   cout &lt;&lt; i &lt;&lt; "\t"; }</pre> <p>5 6 8 10</p>
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**Question 2:**

(10 Marks)

**Tip, Tax, and Total:**

Design a program that calculates the total amount of a meal purchased at a restaurant. The program should ask the user to enter the charge for the food, and then calculate the amount of a 15 percent tip and 7 percent sales tax. Display each of these amounts and the total.

**Answer:**

```
#include<iostream>
using namespace std;
int main ( )
{
float  charge, tip, tax, Total;
cin>> charge;
tip = 0.15 * charge;
tax = 0.07 * charge;
Total = charge + tip + tax;
cout<<"charge:" << charge;
cout<<"tip:" << tip;
cout<<"tax:" << tax;
cout<<"Total:" << Total;
return 0;
}
```

**Question 3:**

(10 Marks)

Write a full program that reads a 3\*3 array from the user. The program should then calculate and display:

- a- The summation of all elements in the array (4 Marks)
- b- The summation of the diagonal elements only (3 Marks)
- c- The summation of the opposite diagonal (3 Marks)

**Answer:**

```
# include < iostream.h >
void main ( ) {
int X [3] [3];          /* This program reads an array (5*5)  from the
user and sum its elements  */
int total = 0 ;
for ( int i = 0 ; i < 3 ; i ++ ) {    // a
    for ( int j = 0 ; j < 3 ; j ++ ) {
        cin >> X [i] [j]; } }
for ( int i = 0 ; i < 3 ; i ++ ) {
    for ( int j = 0 ; j < 3 ; j ++ ) {
        total = total + X [i] [j]; } }
cout << " The summation of the array elements is " << total << endl ;
//b
int sumdiagonal = 0 ;
for ( int i = 0 ; i < 3 ; i ++ ) {
    for ( int j = 0 ; j < 3 ; j ++ ) {
        if ( i = j ) {
            sumdiagonal = sumdiagonal + X [i] [j];
        } } }
cout << " The summation of the diagonal elements is " << sumdiagonal ;
//c
int Oppdiagonal = 0 ;
for ( int i = 0 ; i < 3 ; i ++ ) {
    for ( int j = 0 ; j < 3 ; j ++ ) {
        if ( i + j == 2 ) {
            Oppdiagonal = Oppdiagonal + X [i] [j];
        } } }
cout << " The summation of the diagonal elements is " << sumdiagonal ;
}
```

**Question 4:**

(15 Marks)

Write a full program including two functions. The program should ask the user to enter a number, and decides if it is positive or negative and if it is odd or even. Use a function called *OddEven* to decide if the number is odd or even, and use another function called *PositiveNegative* to decide if it positive or negative.

**Answer:**

```
# include < iostream>
void OddEven ( int ) ;           // Function declaration (prototype)
void PositiveNegative ( int ) ; // Function declaration (prototype)
void main ( ) {
int number ;
cout << " Please enter a number: " ;
cin >> number ;
OddEven ( number ) ;           // Function call
PositiveNegative ( number ) ; // Function call
}
```

```
void OddEven ( int number ) { // Function definition
if ( number % 2 == 0 )
cout << " your number is even " ;
else
cout << " your number is odd " ;
}
```

```
void PositiveNegative ( int number ) { // Function definition
if ( number > 0 )
cout << " your number is positive " ;
else
cout << " your number is negative " ;
}
```

**Question 5:**

(15 Marks)

Write a C++ program to accept an input from the user and determine whether it is a small character, a capital character, a digit or a special character according to:

ASCII	Value ranges
0 - 9	48 - 57
A - Z	65 - 90
a - z	97 - 122
Special Characters	0-47, 58-64, 91-96, 123-127

**Answer:**

```
#include<iostream>
using namespace std;
int main ()
{
    char ch;
    cout<<"Enter any character:";
    cin>>ch;

    if (ch>=65 && ch<=90)
        cout<<"Character is a capital letter";
    else if (ch>=97 && ch<=122)
        cout<<"Character is a small letter";
    else if (ch>=48 && ch<=57)
        cout<<"Character is a digit";
    else if ((ch>0 && ch<=47)||(ch>=58 && ch<=64)||
        (ch>=91 && ch<=96)||(ch>=123 && ch<=127))
        cout<<"Character is a special symbol";

    return 0;
}
```

*Good Luck*  
*Dr. Shady Elmashad*