Q1/ Write a C++ program that outputs the following text on screen:

```
Oh what
a happy day!
Oh yes, what
a happy day!
```

Use the manipulator "endl" where appropriate.

Answer/

```
#include <iostream>
using namespace std;
int main() {
    cout << "Oh what" << endl;
    cout << "a happy day!" << endl;
    cout << "Oh yes," << endl;
    cout << "what a happy day!" << endl;
    return 0;
}
```

Q2/ The following program contains several errors:

```
*/ Now you should not forget your glasses //
#include <stream>
int main
{
cout << "If this text",
 cout >> " appears on your display, ";
cout << " endl;"
cout << 'you can pat yourself on '
<< " the back!" << endl.
return 0;
)
```

Resolve the errors and run the program to test your changes.

Answer/

```
// Now you should not forget your glasses
#include <iostream>
using namespace std;


int main() {
    cout << "If this text";
    cout << " appears on your display, ";
    cout << endl;
    cout << "you can pat yourself on "
         << "the back!" << endl;
    return 0;
}
```

Q3/ What does the following C++ program output on screen?

```
#include <iostream>
using namespace std;
int main() {
    int age = 20;
    float height = 5.9;
    cout << "Age: " << age << endl;
    cout << "Height: " << height << " feet" << endl;
    return 0;
}
```

Answer/

```
Age: 20
Height: 5.9 feet
```

Q4/ What does the following C++ program output on the screen if the user enters 5 and 3?

```
#include <iostream>
using namespace std;


int main() {
   float length, width;
   cout << "Enter the length of the rectangle: ";
   cin >> length;
   cout << "Enter the width of the rectangle: ";
   cin >> width;
   float area = length * width;
   cout << "The area of the rectangle is: " << area << endl;
   return 0;
}
```

Answer/

If the user enters 5 and 3, the program outputs:

```
Enter the length of the rectangle: 5
Enter the width of the rectangle: 3
The area of the rectangle is: 15
```

Q5/ Write a C++ program that calculates the average of three numbers entered by the user. The program should prompt the user to enter three numbers, compute their average, and then display the result.

Answer/

```
#include <iostream>

using namespace std;


int main() {

    float num1, num2, num3;

    cout << "Enter three numbers: ";

    cin >> num1 >> num2 >> num3;


    float average = (num1 + num2 + num3) / 3;


    cout << "The average of " << num1 << ", " << num2 << ", and " << num3 << " is: " << average << endl;


    return 0;

}
```

Here's an example of what the interaction might look like:

```
Enter three numbers: 4.5 3.2 6.8
The average of 4.5, 3.2, and 6.8 is: 4.83333
```

Q6/ Write a C++ program that calculates the total cost of buying several items, including tax. The program should prompt the user to enter the price of three different items and the sales tax. The program should then calculate and display the total cost before tax and the total cost after tax.

Answer/

```
#include <iostream>
using namespace std;

int main() {
   float item1, item2, item3, taxRate;

   // Prompt the user to enter the prices of the three items
   cout << "Enter the price of the first item: ";
   cin >> item1;
   cout << "Enter the price of the second item: ";
   cin >> item2;
   cout << "Enter the price of the third item: ";
   cin >> item3;

   // Prompt the user to enter the sales tax rate
   cout << "Enter the sales tax rate (as a percentage): ";
   cin >> taxRate;

   // Calculate the total cost before tax
   float totalBeforeTax = item1 + item2 + item3;

   // Calculate the total tax amount
   float taxAmount = totalBeforeTax * (taxRate / 100);

   // Calculate the total cost after tax
   float totalAfterTax = totalBeforeTax + taxAmount;
```

```
    // Display the results
    cout << "Total cost before tax: $" << totalBeforeTax << endl;
    cout << "Total tax amount: $" << taxAmount << endl;
    cout << "Total cost after tax: $" << totalAfterTax << endl;

    return 0;
}
```

Here's an example of what the interaction might look like:

```
Enter the price of the first item: 10.50
Enter the price of the second item: 20.75
Enter the price of the third item: 15.30
Enter the sales tax rate (as a percentage): 8.5
Total cost before tax: $46.55
Total tax amount: $3.95675
Total cost after tax: $50.5068
```

Q7/ A school has following rules for grading system:

a. Below 25 - F

b. 25 to 45 - E

c. 45 to 50 - D

d. 50 to 60 - C

e. 60 to 80 - B

f. Above 80 - A

Ask user to enter marks and print the corresponding grade.

Answer/

```
#include <iostream>
int main()
{
	using namespace std;
	int marks;
	cout << "Enter marks" << endl;
	cin >> marks;
	if (marks < 25){
		cout << "F" << endl;
	}
	else if(marks >=25 && marks <45){
		cout << "E" << endl;
	}
	else if(marks >=45 && marks <50){
		cout << "D" << endl;
	}
	else if(marks >=50 && marks <60){
		cout << "C" << endl;
	}
	else if(marks >=60 && marks <80){
```

```
                cout << "B" << endl;
        }
        else if(marks >=80 && marks <100){
                cout << "A" << endl;
        }
        else{
                cout << "Invalid marks" << endl;
        }
        return 0;
}
```

Q8/ Write a program in C++ to find the sum of the first 10 natural numbers.

Answer/

```
#include <iostream>
using namespace std;

int main()
{
   int i, sum = 0;
   cout << " The natural numbers are: \n";

   // Loop to print the first 10 natural numbers and calculate their sum
   for (i = 1; i <= 10; i++)
   {
      cout << i << " ";
      sum = sum + i;
   }
   cout << "\n The sum of first 10 natural numbers: " << sum << endl;
}
```

Output:

```
The natural numbers are:
1 2 3 4 5 6 7 8 9 10
 The sum of first 10 natural numbers: 55
```

Q9/ Display Numbers from 1 to 5 using 'for loop' or 'while loop'.

Answer/

1) **Using "While loop"**

```
#include <iostream>
using namespace std;

int main() {
   int i = 1;

   // while loop from 1 to 5
   while (i <= 5) {
      cout << i << " ";
      ++i;
   }

   return 0;
}
```

Output

```
1 2 3 4 5
```

2) Using "For loop"

```
#include <iostream>
using namespace std;
```

```
int main() {
    // for loop from 1 to 5
    for (int i = 1; i <= 5; ++i) {
        cout << i << " ";
    }

    return 0;
}
```

Output

```
1 2 3 4 5
```

Q10/ Find the sum of first n Natural Numbers.

```
#include <iostream>
using namespace std;

int main() {
   int num, sum;
   sum = 0;

   cout << "Enter a positive integer: ";
   cin >> num;

   for (int i = 1; i <= num; ++i) {
      sum += i;
   }

   cout << "Sum = " << sum << endl;

   return 0;
}
```

Output

```
Enter a positive integer: 10
Sum = 55
```

Q11/ Sum of Positive Numbers Only.

```
#include <iostream>
using namespace std;

int main() {
    int number;
    int sum = 0;

    // take input from the user
    cout << "Enter a number: ";
    cin >> number;

    while (number >= 0) {
        // add all positive numbers
        sum += number;

        // take input again if the number is positive
        cout << "Enter a number: ";
        cin >> number;
    }

    // display the sum
    cout << "\nThe sum is " << sum << endl;

    return 0;
}
```

Output

```
Enter a number: 6
Enter a number: 12
Enter a number: 7
Enter a number: 0
Enter a number: -2

The sum is 25
```

Q12/ Display Numbers from 1 to 5 using ‘Do while’.

Answer/

```
#include <iostream>
using namespace std;

int main() {
   int i = 1;

   // do...while loop from 1 to 5
   do {
      cout << i << " ";
      ++i;
   }
   while (i <= 5);

   return 0;
}
```

Output

```
1 2 3 4 5
```

Q13/ Sum of Positive Numbers Only using 'Do while'.

```
#include <iostream>
using namespace std;

int main() {
   int number = 0;
   int sum = 0;

   do {
      sum += number;

      // take input from the user
      cout << "Enter a number: ";
      cin >> number;
   }
   while (number >= 0);

   // display the sum
   cout << "\nThe sum is " << sum << endl;

   return 0;
}
```

Output

```
Enter a number: 6
Enter a number: 12
Enter a number: 7
Enter a number: 0
Enter a number: -2
The sum is 25
```

Q14/ Check Whether Number is Even or Odd using “if else”.

```
#include <iostream>
using namespace std;

int main() {
  int n;

  cout << "Enter an integer: ";
  cin >> n;

  if ( n % 2 == 0)
    cout << n << " is even.";
  else
    cout << n << " is odd.";

  return 0;
}
```

Output

```
Enter an integer: 23
23 is odd.
```

Q15/ Find Largest Number Using "if...else Statement".

```
#include <iostream>
using namespace std;

int main() {
   double n1, n2, n3;

   cout << "Enter three numbers: ";
   cin >> n1 >> n2 >> n3;

   // check if n1 is the largest number
   if(n1 >= n2 && n1 >= n3)
      cout << "Largest number: " << n1;

   // check if n2 is the largest number
   else if(n2 >= n1 && n2 >= n3)
      cout << "Largest number: " << n2;

   // if neither n1 nor n2 are the largest, n3 is the largest
   else
      cout << "Largest number: " << n3;

   return 0;
}
```

Output

```
Enter three numbers: 2.3
8.3
-4.2
Largest number: 8.3
```

Q16/ Write a program that asks for an integer (1-12) representing the month, and depending on the input, show the month name as a word (in English). Use a switch statement. For example, for 1 it should print Jan.

```
#include <iostream>
using namespace std;

int main() {
   int month;

   cout << "Enter an integer (1-12) representing a month: ";
   cin >> month;

   if (month >= 1 && month <= 12) {
      if (month == 1)
         cout << "January" << endl;
      else if (month == 2)
         cout << "February" << endl;
      else if (month == 3)
         cout << "March" << endl;
      else if (month == 4)
         cout << "April" << endl;
      else if (month == 5)
         cout << "May" << endl;
      else if (month == 6)
         cout << "June" << endl;
      else if (month == 7)
         cout << "July" << endl;
      else if (month == 8)
         cout << "August" << endl;
      else if (month == 9)
```

```
            cout << "September" << endl;
        else if (month == 10)
            cout << "October" << endl;
        else if (month == 11)
            cout << "November" << endl;
        else if (month == 12)
            cout << "December" << endl;
    } else {
        cout << "Invalid input. Please enter an integer between 1 and 12." << endl;
    }

    return 0;
}
```

Output:

```
Enter an integer (1-12) representing a month: 4
April
```

Q17/ Make changes in the following program so that it uses a while loop in place of the for loop.

```
#include <iostream>
using namespace std;
int main()
{
 int max;

 cout << "Enter max number";
 cin >> max;
 for(int i=max;i>=0;i--) cout << i << "\n";
 return 0;
}
```

Answer:

```
#include <iostream>
using namespace std;
int main()
{
 int i,max;

 cout << "Enter max number";
 cin >> max;
 i=max;
while (i>=0)
{
 cout<<i<<"\n";
i--;
 }
return 0;
}
```

Q18/ Choose the correct answer,

18.1.Find the output of the following code:

```
#include <iostream>
using namespace std;
int main() {
int x = 10;
cout << -- x + 1<<",";
cout<< x++; }
```

a) 10, 9

b) 10, 10

c) 9, 10

d) 9, 9

18.2.Find the output of the following code:

```
#include <iostream>
using namespace std;
int main() {
int grade = 100;
if (grade > 60 && grade < 100)
cout << "Pass";
else
cout << "Fail"; }
```

a) Pass

b) Fail

c) Error

d) Pass Fail

18.3.Find the output of the following code:

```
#include <iostream>
using namespace std;
int main() {
int x = 1, y = 2;
cout << x - y + 3 * 4 / 5;
}
```

a) 3

b) 2

c) 1

d) 0

18.4.Find the output of the following code:

```
#include <iostream>
using namespace std;
int main() {
double
a = 2.5;
int b = 3;
b = a;
cout << b;
}
```

a) 2

b) 2.5

c) Error

d) 3