

## Worksheet

**Part I For each of the problems write a C++ code to perform the required task.**

**First you should do flow chart for each question.**

- 1) Receive a number and determine whether it is odd or even.

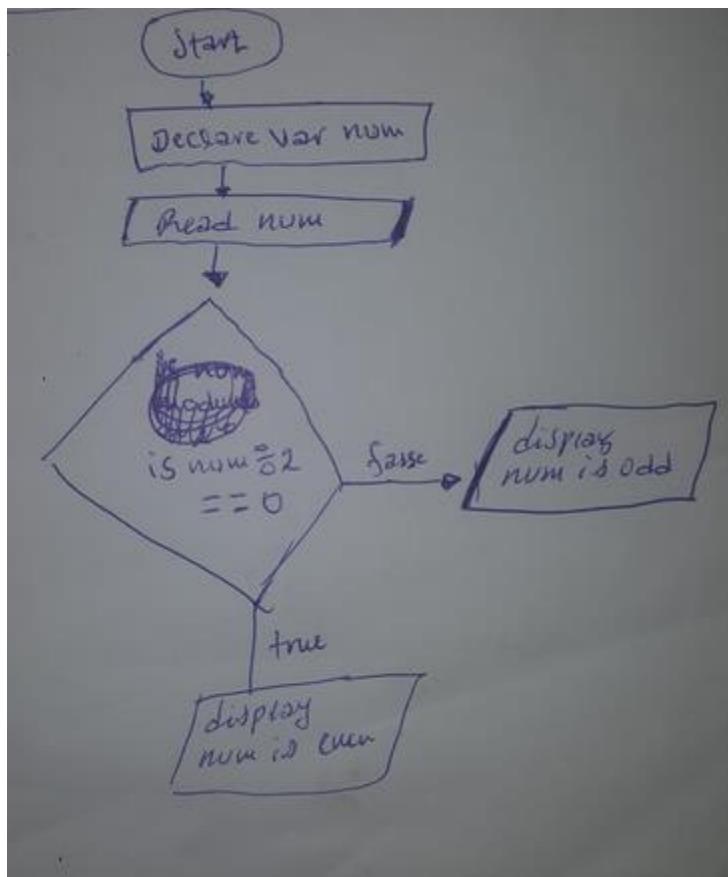
```
#include <iostream>
using namespace std;

int main()
{
    int num;

    cout<< "Enter Number : ";
    cin >> num;

    if(num%2 == 0) {
        cout <<num << " is Even";
    } else {
        cout <<num << " is Odd";
    }

    return 0;
}
```



- 2) Obtain two numbers from the keyboard, and determine and display which (if either) is the larger of the two numbers.

```

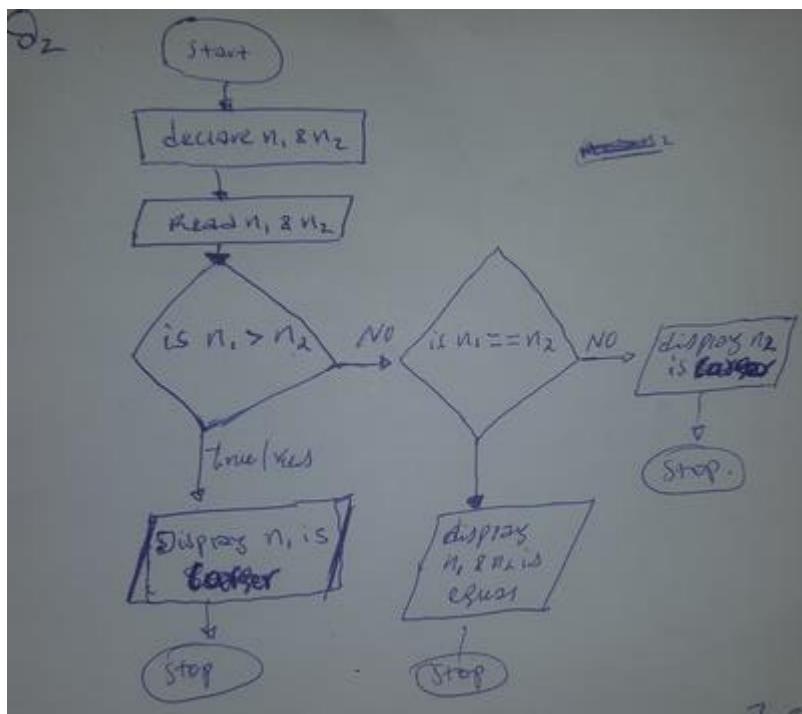
#include <iostream>
using namespace std;

int main()
{
    int a, b;
    cin>>a>>b;

    if(a > b){
        cout << a << " is Larger";
    } else if ( a == b){
        cout << a << " is Equal to " << b;
    } else {
        cout << b << " is Larger";
    }

    return 0;
}

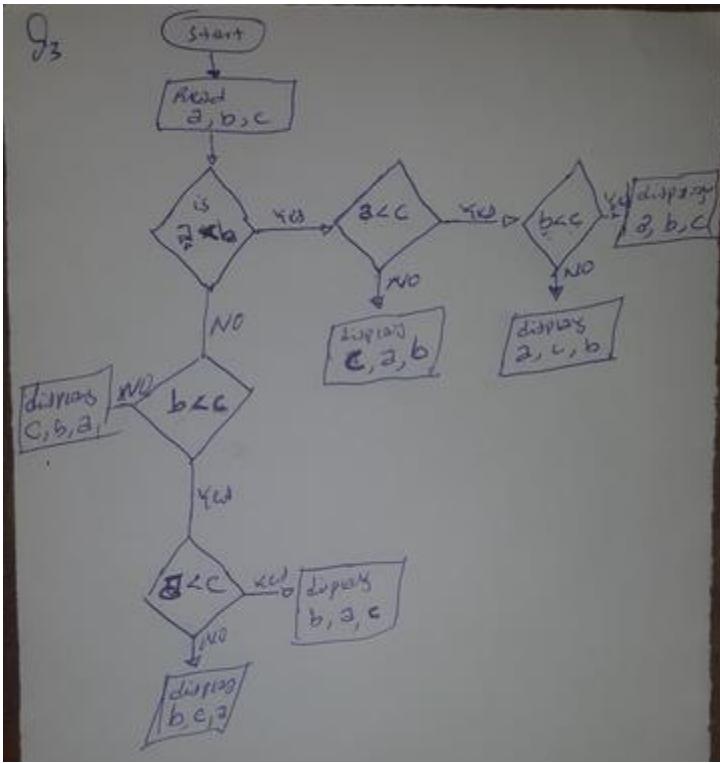
```



- 3) Receive 3 numbers and display them in ascending order from smallest to largest.

```
#include <iostream>
using namespace std;
int main()
{
    int a, b, c;
    cin>>a>>b>>c;

    if(a < b) {
        if(a < c) {
            if(b < c) {
                cout<< a << " " << b << " " << c;
            } else{
                cout<< a << " " << c << " " << b;
            }
        }
        else {
            cout << c << " " << a << " " << b;
        }
    } else {
        if(b < c) {
            if(a < c){
                cout<< b << " " << a << " " << c;
            } else{
                cout<< b << " " << c << " " << a;
            }
        }
        else {
            cout << c << " " << b << " " << a;
        }
    }
    return 0;
}
```



- 4) Add the numbers from 1 to 100 and display the sum

```

#include <iostream>

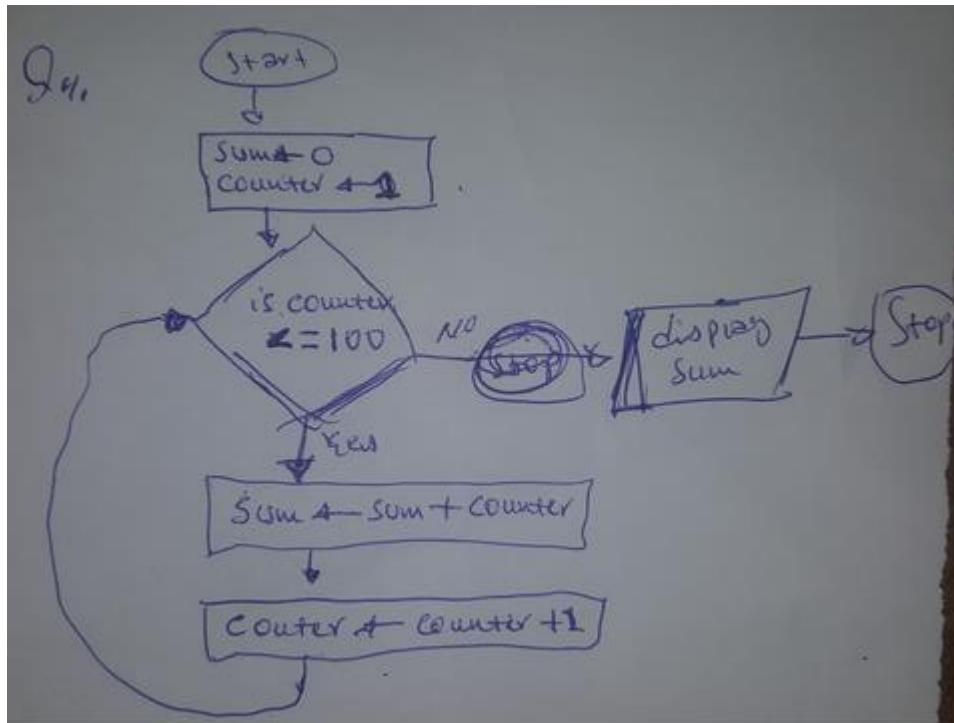
using namespace std;

int main()
{
    int sum = 0;

    for(int i = 1; i <= 100; i++)
    {
        sum = sum + i;
    }

    cout << "Sum = " << sum;

    return 0;
}
  
```



- 5) Add the even numbers between 0 and any positive integer number given by the user.

```
#include <iostream>

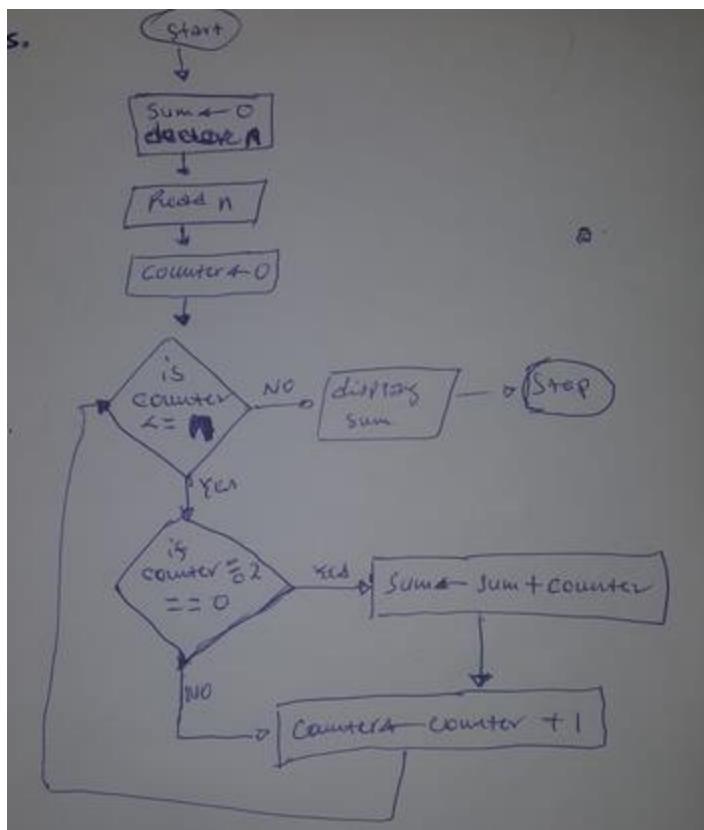
using namespace std;

int main()
{
    int sum = 0;
    int n;
    cin >> n;

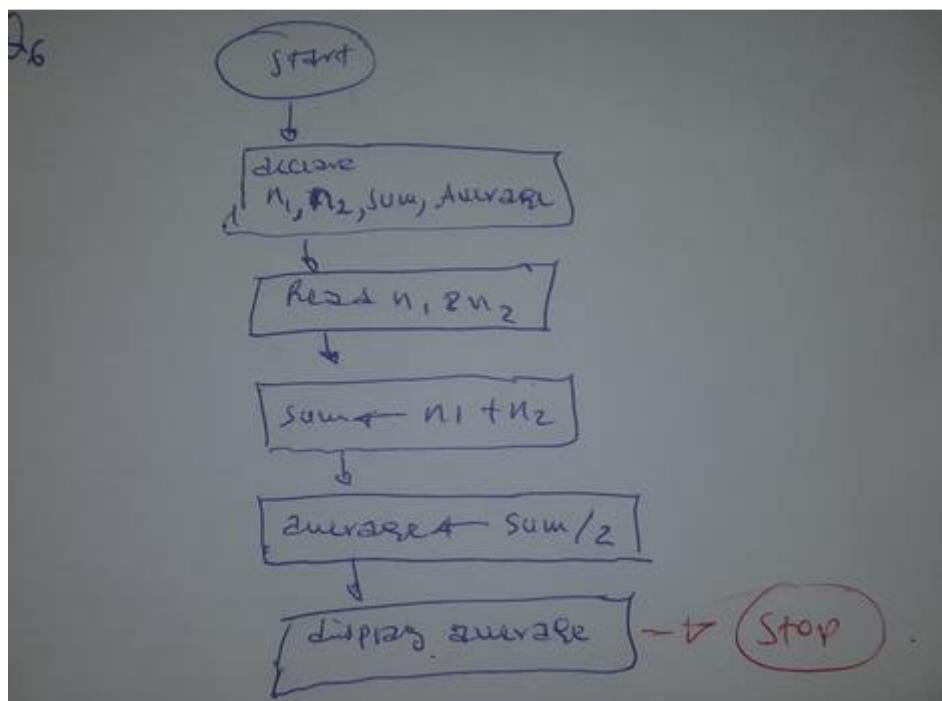
    for(int i = 0; i <= n; i++)
    {
        if(i % 2 == 0)
        {
            sum = sum + i;
        }
    }

    cout << "Sum = " << sum;

    return 0;
}
```



- 6) Find the average of two numbers given by the user.



- 7) Find the average, maximum, minimum, and sum of three numbers given by the user.

```
#include <iostream>

using namespace std;

int main()
{
    float sum = 0;
    float average;

    int a, b, c;

    cin >> a >> b >> c;

    int max = a;
    int min = a;

    if(b > max) {
        max = b;
    }
    if(c > max) {
        max = c;
    }

    if(b < min) {
        min = b;
    }
    if(c < min) {
        min = c;
    }

    cout << "Max = " << max << endl;
    cout << "Min = " << min << endl;

    sum = a + b + c;
    average = sum / 3;

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

    return 0;
}
```

- 8) Find the area of a circle where the radius is provided by the user.
- 9) Swap the contents of two variables using a third variable.

- 10) Swap the content of two variables without using a third variable.
- 11) Read an integer value from the keyboard and display a message indicating if this number is odd or even.
- 12) read 10 integers from the keyboard in the range 0 - 100, and count how many of them are larger than 50, and display this result

```
#include <iostream>

using namespace std;

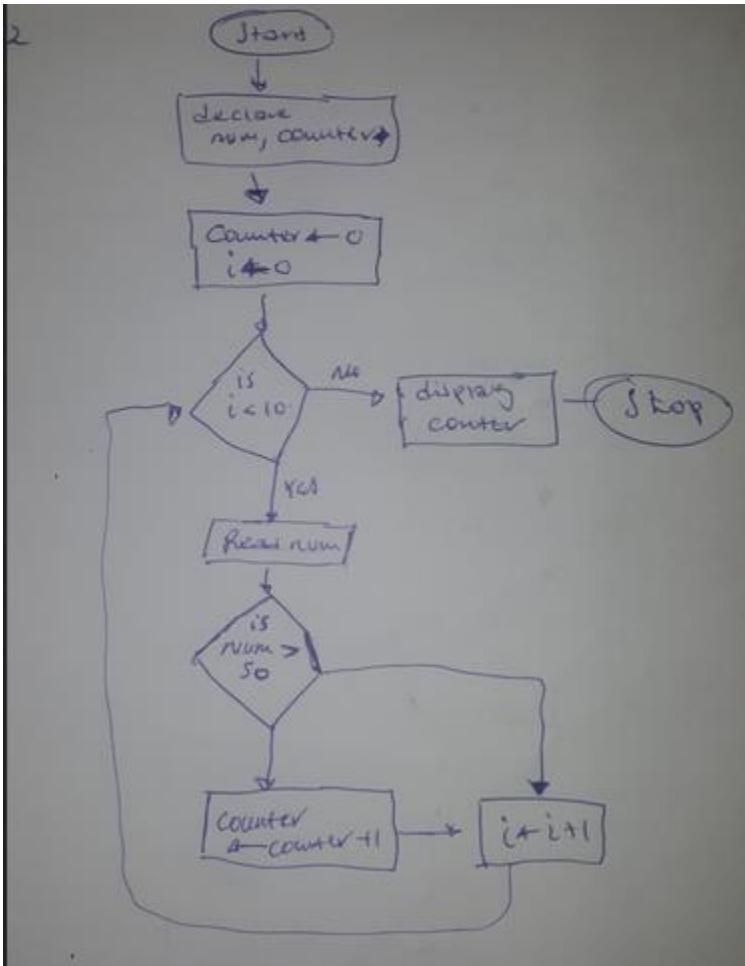
int main()
{
    int num;
    int counter = 0;

    for(int i = 0; i < 10; i++) {
        cin >> num;

        if(num > 50) {
            counter++;
        }
    }

    cout << counter << " numbers are greater than 50";

    return 0;
}
```



- 13) Obtain three integers from the user and display the maximum and the minimum using conditional operator.

```
#include <iostream>
using namespace std;
|
int main()
{
    int a, b, c;

    cin >> a >> b >> c;

    int max = a > b? (a > c? a : c) : (b > c? b : c);
    int min = a < b? (a < c? a : c) : (b < c? b : c);

    cout << " Max = " << max;
    cout << " Min = " << min;

    return 0;
}
```

- 14) Write a program that displays LCM and GCF of the two integers. Note obtain the number from the user.

```

#include <iostream>
using namespace std;
int main()
{
    int n1, n2, max;

    cout << "Enter two numbers: ";
    cin >> n1 >> n2;

    // LCM
    max = (n1 > n2) ? n1 : n2;

    do
    {
        if (max % n1 == 0 && max % n2 == 0)
        {
            cout << "LCM = " << max;
            break;
        }
        else
            ++max;
    } while (true);

    int gcf;

    for (int i = 1; i <= max; i++) {
        if (n1 % i == 0 && n2 % i == 0)
            gcf = i;
    }

    cout << "GCF = " << gcf;

    return 0;
}

```

- 15) Take an integer from the user and display the factorial of that number (draw only the flow chart).

**Part II: Write C++ program for the following questions (Use Loops where necessary)**

1. Write for, do-while, and while statements to compute the following sums and products.
  - a.  $1+2+3+\dots+100$
  - b.  $5+10+15+\dots+50$

- c.  $\dots + \frac{1}{15}$   
d.  $1 \times 2 \times 3 \times \dots \times 20$
2. A prime number is an integer greater than one and divisible only by itself and one. The first seven prime numbers are 2, 3, 5, 7, 11, 13, and 17. Write a program that displays all the prime numbers between 1 and 100.
  3. Write a C++ program that counts the number of digits in an integer number. For example; 23,498 has five digits.

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

int main()
{
    int n;
    int counter = 0;

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

    if(n < 0)
        n = n * -1;

    while(n > 0) {
        counter++;
        n /= 10;
    }

    cout << counter;
    return 0;
}
```

4. Write a C++ application that can compute the letter grade of a student after accepting the student's mid and final mark. The program should only accept mid result [0-40] and final [0- 60]. If the data entered violates this rule, the program should display that the user should enter the mark in the specified range. The program is also expected to run until the user refuses to continue. Note use the following criteria to display the later grade : if total mark>80 grade is A, if total mark>75 grade is B, if total mark>55 the grade is C, if total mark>45 the grade is D and total mark<45 the grade is F.

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

int main()
{
    int mid;
    int fin;
    char ch = 'y';

    do {
        cout << "Enter Mid : ";
        cin >> mid;
        cout << "Enter Fin : ";
        cin >> fin;

        if ( (mid > 40 || mid < 0) || (mid > 60 || mid < 0) )
        {
            cout << "Please Enter Correct Mark" << endl;
            continue;
        }

        int tot = mid + fin;

        if(tot >= 80){
            cout << "MARK = A" << endl;
        } else if(tot >= 75){

            cout << "MARK = B" << endl;

        } else if(tot >= 55){

    }
```

```

    } else if(tot >= 55) {

        cout << "MARK = C" << endl;

    } else if(tot >= 45) {

        cout << "MARK = D" << endl;

    } else{

        cout << "MARK = F" << endl;

    }

    cout << "Enter y to Continue and n to Stop : ";
    cin >> ch;

}

}while(ch == 'y');

return 0;
}

```

5. Write a C++ program that accepts a positive number from the user and displays the factorial of that number. Use for loops to find the factorial of the number.
6. Write a C++ program that accepts marks of five students and then displays their average. The program should not accept mark which is less than 0 and mark greater than 100.
7. Write a C++ program using for loop that can compute the following summation:

$$\sum_{i=1}^{30} \left[ \left( \frac{i}{3} \right)^* 2 \right]$$

8. Develop a calculator program that computes and displays the result of a single requested operation.

E.g. if the input is

15 \* 20, then the program should display 15 \* 20 equals 300

If the operator is not legal, as in the following example

24 ~ 25 then the program displays ~ is unrecognized operator

As a final example, if the denominator for a division is 0, as in the following input: 23 / 0 then the program should display the following:

23 / 0 can't be computed: denominator is 0.

---

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

int main() {

    int n1, n2;
    float result;
    char op;

    cin>> n1 >> op >> n2;

    if(op == '/') {

        if(n2 == 0)
        {
            cout << " can't be computed: denominator is 0";
        } else {
            result = n1/ n2;
        }

    } else if(op == '+') {

        cout << result;
    }
    else if(op == '-') {

        result = n1 - n2;
    }

    else if(op == '%') {

        result = n1 % n2;
    }

    else if(op == '**') {

        result = n1 * n2;
    }
    else {

        cout << op << " is unrecognized operator";
    }

    cout << result;
}
```

9. Convert the following flowchart in to a C++ program.

