

Task 1:

Write a program to ask user input START/END and iterate loop from start to end and perform following tasks:

- a) Print numbers using FOR/WHILE/DO WHILE.
- b) Test on following values and observe output (You may be asked anytime during lab regarding this observation)
- c) While testing on last two inputs, it may work abnormally. Now modify above program so that it should work t time where t is difference between start/end.
- d) How for/while/do-while loop behaves?

Solution:

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

    int startValue,endValue;
    int i,k=1;
    cout<<"Enter Start value: ";
    cin>>startValue;
    cout<<"Enter End Value: ";
    cin>>endValue;
    int j = endValue - startValue;
    if(j>0)
        cout<<"The difference between numbers is "<< j<<", Therefore, your program
will run "<<j<<" times"<<endl<<endl;
    while(k<=j){
        for(i = startValue; i<endValue; i++){
            cout<<i<<" ";
        }
        cout<<endl;
        k++;
    }
    cout<<endl;
    system("PAUSE");
    return 0;}
```

Output:

```
Enter Start Value: 2
Enter End Value: 9
The difference between numbers is 7, Therefore, your program will run 7 times

2 3 4 5 6 7 8
2 3 4 5 6 7 8
2 3 4 5 6 7 8
2 3 4 5 6 7 8
2 3 4 5 6 7 8
2 3 4 5 6 7 8
2 3 4 5 6 7 8
```

Task 2:

Write a program to ask user input n_courses (Total Courses), then iterate loop n_courses time and ask user marks in each course and perform following tasks:

- a) Calculate average of all courses marks.
- b) Calculate total percentage of all courses.
- c) Tell the user whether s/he is PASS/FAIL, FAIL ⇔ less than 60, and otherwise PASS.

Solution:

```
#include<iostream>
using namespace std;
int main(){
    int i=1,nCourse,num=1;
    float average,percentage,marks,totalMarks=0;
    cout<<"Enter number of courses you have done... ";
    cin>>nCourse;
    while(i<=nCourse){
        cout<<"Enter Marks of course "<<num<<" : ";
        cin>>marks;
        totalMarks+=marks;
        num++;
        i++;
    }

    cout<<endl;
    average = totalMarks/nCourse;
    cout<<"Your Average score is :"<<average<<endl;
    percentage= (totalMarks/(nCourse*50))*100;
    cout<<"Your Percentage is :"<<percentage<<endl;

    if(percentage >=60)
        cout<<"Congrats! You have passed the exam...";
    else
        cout<<"Bad Luck! You are fail...";

    cout<<endl;cout<<endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter number of courses you have done... 3
Enter Marks of course 1 : 34
Enter Marks of course 2 : 45
Enter Marks of course 3 : 43

Your Average score is :40.6667
Your Percentage is :81.3333
Congrats! You have passed the exam...
```

Task 3:

Write a program to output the N terms of HARMONIC series and their SUM.

Input:5

Output: $1/1 + 1/2 + 1/3 + 1/4 + 1/5$

Total Sum is: 2.28333

Solution:

```
#include<iostream>
using namespace std;
int main(){
    int i=1,nTerms;
    float sum=0,totalSum=0;
    cout<<"Enter number of terms: ";
    cin>>nTerms;

    while(i<=nTerms){
        cout<<"1/"<<i<<" ";
        sum = 1.0/i;
        totalSum += sum;
        i++;
        if(i<=nTerms)
            cout<<"+ ";
    }
    cout<<endl;
    cout<<"The sum of terms is: "<<totalSum;

    cout<<endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter number of terms: 5
1/1 + 1/2 + 1/3 + 1/4 + 1/5
The sum of terms is: 2.28333
```

Task 4:

Write a program to ask user NAME and print “Welcome Dear NAME”, then ask user whether user wants to continue or exit (y ↴ continue, e ↴ exit). Print appropriate message to tell user how to EXIT/CONTINUE.

Note: In following each task, you have to ask user whether CONTINUE/EXIT, if continue then program should RUN AGAIN otherwise TERMINATE.

Solution:

```
#include<iostream>
#include<string>
using namespace std;
int main(){
    string name;
    char decision;
    while(true){
        cout<<"Enter your name: ";
        cin>>name;
        cout<<"Welcome dear "<<name<<endl;
        cout<<"Do you want to continue (y/n): ";
        cin>>decision;
        if (decision=='n')
            break;
    }

    cout<<endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter your name: kamran
Welcome dear kamran
Do you want to continue (y/n): y
Enter your name: ali
Welcome dear ali
Do you want to continue (y/n): n
```

Task 5:

Write a program to ask user input N and perform following tasks: a) Check whether N is PRIME/NOT?

Solution:

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

int main() {
    int num,i,count=0;
    cout << endl;
    cout << "Enter number: ";
    cin >> num;

    if (num <= 1) {
        cout << "Not Prime number";
    }
    else {

        for (i = 2; i <= sqrt(num); i++) {
            if (num % i == 0) {
                cout << "Not Prime number";
                break;
            }
        }

        if (i > sqrt(num)) {
            cout << "Prime number";
        }
    }

    cout << endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter number: 5
Prime number
Press any key to continue . . . |
```

Task 6:

Write a program to ask user input N and perform following tasks:

a) Check whether N comes in FIBONACCI series or NOT?

b) Generate FIBONACCI series till N.

Note: FIBONACCI series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55...

Solution:

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

int main() {
    int n;
    bool found= false;
    cout << "Enter number: ";
    cin >> n;

    int fib[n+5];

    fib[0] = 0;
    fib[1] = 1;

    for (int i = 2; i < (n+5); i++) {
        fib[i] = fib[i - 1] + fib[i - 2];
    }
    for (int i = 0; i < (n+5); i++) {
        if(fib[i]==n){
            found = true;
        }
    }
    if(found==true)
        cout<<"This number is INCLUDED in fibancci series";
    else
        cout<<"This number is NOT INCLUDED in fibancci series";

    cout<<endl;
    system("PAUSE");
    return 0;
}
```

Output:

```
Enter number: 35
This number is NOT INCLUDED in fibancci series
Press any key to continue . . . |
```

Task 7:

Write a program to ask user input N and design following patterns: Input N = 5

Output:

```
1  
1 2  
1 2 3  
1 2 3 4  
1 2 3 4 5
```

Solution:

```
#include<iostream>  
using namespace std;  
int main(){  
    int num;  
    cout<<"Enter number: "  
    cin>>num;  
  
    for( int i = 1; i<=num; i++) {  
        for (int j = 1; j <= i; j++) {  
            cout << j << " ";  
        }  
        cout<<endl;  
    }  
    int i=0;  
    while(i<=num){  
        for (int j =65; j<65+i;j++){  
            cout<<(char)j << " ";  
        }  
        i++;  
        cout<<endl;  }  
  
cout<<endl;  
system("PAUSE");  
return 0;}
```

Output:

```
Enter number: 7
```

```
1  
1   2  
1   2   3  
1   2   3   4  
1   2   3   4   5  
1   2   3   4   5   6  
1   2   3   4   5   6   7
```

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