OOPS LAB FILE

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COMPILER USED: GCC COMPILER

1. Write a program to check whether a no. is even or odd.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
        ios_base::sync_with_stdio(false); //fast input output
        cin.tie(NULL);
        int n ; //declaring variables
        cin >> n; //input
        if(n%2) { //checking if even or odd and printing the output
                cout << "ODD" ;
        }
        else {
                cout << "EVEN" ;
        }
   return 0;
}
```

Input	**Output**
4	EVEN
3	ODD

2. Write a program to display first 10 prime numbers.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
    ios_base::sync_with_stdio(false); //fast input output
    cin.tie(NULL);
    int j, i, flag = 0, count = 0 ; //declaring variables
    for( i = 2 ; i < 100 ; i++) {  //checking if number prime
            flag = 0 ;
            for( j = 2 ; j <= sqrt(i) ; j++ ) {
                    if(i % j == 0) {
                            flag = 1;
                            break ;
                    }
            }
            if(flag) { //if flag=0 then prime
                    continue ;
            }
            else
            cout << i << " " ;
            count ++;
            if(count == 10)
            break ;
    }
return 0;
 }
```

Input	Output
-	2 3 5 7 11 13 15 17 19 23

3. Program to display prime numbers from 1 to n.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
    ios_base::sync_with_stdio(false); //fast input output
    cin.tie(NULL);
    int n, j, i, flag = 0, count = 0 ; //declaring variables
    cin >> n ; //taking input
    for( i = 2 ; i < 1000000000 ; i++) {  //checking if number prime
            flag = 0 ;
            for( j = 2 ; j <= sqrt(i) ; j++ ) {
                    if(i % j == 0) {
                            flag = 1;
                            break ;
                    }
            }
            if(flag) { //if flag=0 then prime
                    continue ;
            }
            else
            cout << i << " " ;
            count ++;
            if(count == n) //printing only n prime numbers
            break ;
    }

   return 0;
}
```

Input	Output
9	2 3 5 7 11 13 15 17 19
3	2 3 5

4. Program to check whether a given no. is prime or not.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
        ios_base::sync_with_stdio(false); //fast input output
        cin.tie(NULL);
        int n, j, i, flag = 0 ; //declaring variables
        cin >> n ; //taking input
        for( j = 2 ; j <= sqrt(n); j++ ) {
                if(n % j == 0) {
                        flag = 1;
                        break ;
                }
        }
        if(flag) { //if flag=0 then prime
                cout << "NOT PRIME" ;
        }
        else
        cout << "PRIME" ;

   return 0;
}
```

Input	**Output**
13	PRIME
14	NOT PRIME

5. Program to find sum of n natural numbers.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
    ios_base::sync_with_stdio(false); //fast input output
    cin.tie(NULL);
    int n, i, sum = 0; //declaring variables
    cin >> n ; //taking input
    for( i = 1 ; i <= n ; i++) {  //calculating sum of first n numbers
            sum += i ;
    }
    cout << sum ;

   return 0;
}
```

Input	Output
4	10
7	28

6. Program to find whether a given year is a leap year or not.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
        ios_base::sync_with_stdio(false); //fast input output
        cin.tie(NULL);
        int n; //declaring variables
        cin >> n ; //taking input
        if(n % 4 == 0) cout << "LEAP" ; //printing if leap or not
        else cout << "NOT LEAP" ;
   return 0;
}
```

Input	**Output**
2014	NOT LEAP
2012	LEAP

7. Program to find the ASCII value of a given character.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
        ios_base::sync_with_stdio(false); //fast input output
        cin.tie(NULL);
        char c ; //declaring variable
        int n; //declaring variable
        cin >> c ; //taking input
        n = c;
        cout << n ; //printing ascii value
   return 0;
}
```

Input	**Output**
a	97
A	65

8. Program to find duplicate characters in a string.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;


int main()
{
        ios_base::sync_with_stdio(false);
        cin.tie(NULL);
        string s ; //declaring variables and scanning input
        cin >> s;
        int i = 0, j, flag = 0 ;
        while( s[i]!='\0') { //checking if duplicates present
                j = i + 1;
                while( s[j]!='\0') {
                        if (s[i] == s[j]) {
                                flag = 1;
                                break ;
                        }
                        j++ ;
                }
                i++ ;
        }
        if(flag) cout << "DUPLICATE ELEMENTS PRESENT" ; //printing the result
        else cout << "NO DUPLICATE ELEMENTS PRESENT" ;
   return 0;
}
```

Input	**Output**
abc	NO DUPLICATE ELEMENTS PRESENT
aba	DUPLICATE ELEMENTS PRESENT

9. Program to check whether a string is palindrome or not.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define ull unsigned long long int
#define M 1000000007
using namespace std;

int main()
{
                        string s; //declaring and scanning the string
                        cin >>  s;
                        int i, flag = 0 ;
                        for( i = 0 ; i <= s.length()/2; i++) { // checking if the string is a
pallindrome
                                if(s[i] != s[s.length()-1-i]) {
                                        flag = 1;
                                        break;
                                }
                        }
                        if(flag) { //if flag=1 that means not a pallindrome
                                cout <<"NOT A PALLINDROME" ; //printing the result
                        }
                        else {
                                cout <<"PALLINDROME";
                        }
   return 0;
}
```

Input	**Output**
stats	PALLINDROME
statss	NOT A PALLINDROME

10. Program to find factorial of a given no.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

long long int fac(int n) { //recursive factorial function
      if(n == 1) return 1;   //base condition for n = 1
      return n * fac(n-1) ;  //recursive function call
}
int main()
{
      ios_base::sync_with_stdio(false);
      cin.tie(NULL);
      int n; //declaring and scanning variables
      cin >> n ;
      cout << (ll)fac(n) ;
    return 0;
}
```

Input	Output
5	120
3	6

11. Program to display Fibonacci series upto 100.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll unsigned long long int
#define M 1000000007
using namespace std;
ll a[101] ; //memoization array
long long int fib(int n) { //recursive factorial function
    if(n <= 1) return n;   //base condition for n = 1
    if(a[n] != -1) { //accessing memoized array
            return a[n] ;
    }
    return a[n] = fib(n-1) + fib(n-2);  //recursive function call
}

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    int n = 100 ; //declaring + initialising and scanning variables
    memset(a,-1,sizeof(a)) ; //initialising memoization array
    a[0] = 0 ;
    a[1] = 1 ;
    cout << (ll)fib(n) ; //function call
    return 0;
}
```

Input	Output
-	354224848179261915075

12. Program to sort a given set of numbers in ascending and descending order.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define ull unsigned long long int
#define M 1000000007
using namespace std;

int main()
{
    cout << "1. Ascending\n2. Descending\nEnter your choice:";
    int choice ;
    cin >> choice ;
    if(choice!= 1 && choice != 2) cout << "Invalid input" ;
    int n, i;
    cin >> n ;
    int a[n] ;
    for( i = 0 ; i < n ; i++ ) {
      cin >> a[i] ;
      }
      if(choice == 1 ) sort(a,a+ n) ; //sorting as per the choice
      else if(choice == 2) {
                sort(a,a+n) ;
                reverse(a,a+n) ;
      }

      for( i = 0 ; i < n ; i++ ) { //printing the output
      cout << a[i] << " " ;
      }
    return 0;
}
```

Input	Output
1 4 5 1 3 24	1 3 5 24
2 4 5 1 3 24	24 5 3 1

13. Program to reverse a word in a string.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll unsigned long long int
#define M 1000000007
using namespace std;

void rev(string s, int start , int end) {
    int n = end - start + 1;
    for (int i = 0; i < n / 2; i++) { // reversing the substring
        swap(s[i + start], s[n - i - 1 + start]);
    }
    for (int i = 0; i < s.length(); i++) {  // printing the result
        cout << s[i] ;
    }

}
int main()
{
      char c[100] ; //declaring and scanning variables
      cin.getline(s,sizeof(s));
      int start, end ;
      cin >> start >> end ; //starting and ending indices of the string to be reversed
    rev(s, start, end); //function to reverse the substring
    return 0;
}
```

Input	**Output**
My name is prabhav 11 17	My name is vahbarp

14. Check whether a given no. is Armstrong no. or not.

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main() {
  ios_base::sync_with_stdio(false);
  cin.tie(NULL);
  int n, sum = 0 , temp, r, d ; //initialising and declaring variables
  cin >> n ;
  temp = n;
  while (temp != 0) { //calculating number of digits in n
    d++;
    temp = temp/10;
  }
  temp = n;
  sum = 0;
  while (temp != 0) { //calculating if armstronog or not
    r = temp%10;
    sum += pow(r, d);
    temp = temp/10;
  }
  if (n == sum) // if equal then armstrong number else not
  cout << "ARMSTRONG";
  else
  cout<<"NOT ARMSTRONG";
  return 0;
}
```

Input	**Output**
153	ARMSTRONG
aba	NOT ARMSTRONG

15. Write a program to make calculator using switch statement

```
#include <bits/stdc++.h>
#include<math.h>
#define ll long long int
#define M 1000000007
using namespace std;

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    char c; //declaring variables and scanning input
    float num1, num2;
    cout << "Enter +, -, *, /";
    cin >> c ;
    cout << "Enter two numbers";
    cin >> num1 >> num2;

    switch(c) //calculating as per the operater entered
    {
        case '+':
            cout << num1+num2;
            break;
        case '-':
            cout << num1-num2;
            break;
        case '*':
            cout << num1*num2;
            break;
        case '/':
            cout << num1/num2;
            break;
        default:
            //if invalid input
            cout << "Invalid Input";
            break;
    }

    return 0;
}
```

Input	**Output**
* 2 3	6
/ 5 2	2.5