OBJECT ORIENTED PROGRAMMING LAB

LAB RECORD

Submitted by

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Table of Contents

Lab Exercise 1: Revisiting C

//1. Write a program to find the number of digits in a given number.

```
#include<stdio.h>
void main(){
   long long int i,n;
   printf("Enter the Number = ");
   scanf("%lli",&n);
   for(i=0;n>0;i++,n/=10);
   printf("%d",i);
}
```

//2. Write a program to calculate factorial of a number N using recursion.

```
#include<stdio.h>
int fact(int n);
void main(){
   int n;
   printf("Enter the Number = ");
   scanf("%d",&n);
   printf("\n%d",fact(n));
}
int fact(int n){
   int f=n;
   if(n==1){
      return 1;
   }
   else{
      return (fact(n-1)*f);
   }
}
```

//3. Write a program to print "Hello JUET!" without main() function.

```
#include<stdio.h>
void phello(void);
void main()
{
   phello();
```

```
}
void phello(void){
   printf("Hello JUET!");
}
```

//4.Write a program to print "Hello JUET !" without using any semicolon.

```
#include<stdio.h>
void main(){
   switch(printf("hello world")){}
}
```

//5. Write a program to round off an integer ‘i’ to the next largest multiple of another //integer //‘j’. For example, you will get 259 if i=256 is rounded off to the next largest //multiple of j=7.

```
#include<stdio.h>
void main(){
   int i,j;
   printf("Enter the Number i and j = ");
   scanf("%d %d",&i,&j);
   //i=(i-1)+(i%j);
   while(i%j!=0){
      i++;
   }
   printf("%d %d",i,j);
}
```

//6. Write a program which finds a four digit number AABB which is a perfect square. //A and B represent different digits. For example 7744 is a four digit perfect square //number which is also satisfying the condition AABB ie. //first two digits (AA=77) are same and last two digits (BB=44) are same.

```
#include<stdio.h>
int sqr(int x);
void main(){
   int i,j,A,B;
   for(A=1;A<10;A++){
      for(B=0;B<10;B++){
         j=A*1000+A*100+B*10+B*1;
         sqr(j);
```

```
        }
    }
}
int sqr(int x){
    int i;
    for(i=0;i<x/4;i++){
        if(i*i==x){printf("%d %d\n",x,i);}
    }
```

//7. Write a function which takes a string as input from user and returns the length of that //string without using any string library functions. Call this function from mail function.

```
#include<stdio.h>
int len(char *c);
void main(){
    char str[20];
    printf("Enter the String = ");
    scanf("%s",str);
    printf("Length of string = %d",len(str));
}
int len(char *c){
    int i=0;
    while(c[i]!='\0'){
        i++;
    }
    return i;
}
```

//8. Write a function strcat(s,t) which concatenates the string t to the end of string s. //Call this function from main function.

```
#include<iostream>
#include<string.h>
using namespace std;
void Strcat(char s[],char t[]);
int main(){
    char s[50],t[50];
    cout<<"Enter the String 1 = ";
    cin>>s;
    cout<<"Enter the String 2 = ";
    cin>>t;
    //cout<<"Concatenated String = "<<
    Strcat(s,t);
```

```
   return 0;
}
void Strcat(char ns[],char t[]){
   int i=0,k=0,l1,l2;
   l1=strlen(ns);
   l2=strlen(t);
   for(i=l1;i<l1+l2;i++,k++){
      ns[i]=t[k];
   }
   ns[i+1]='\0';
   cout<<"new String = "<<ns<<endl;
}
```

Advance practice problems -

//1. Given an array A of size N-1 and given that there are numbers from 1 to N with one
//element missing;
// Write program to find the missing number.
// Test case 1: Given array: 1 2 3 5; missing element is 4.
// Test case 2: Given array: 1 2 3 4 5 6 7 8 10; missing element is 9.

```
#include<iostream>
using namespace std;
int main(){
   int n,m=0;
   cout<<"Enter the Size = ";
   cin>>n;
   int A[n-1];
   for(int i=0;i<n-1;i++){
      cout<<"Enter the Values = ";
      cin>>A[i];
      if(((A[i])-A[i-1])!=1){
         m=(A[i]-1);
      }
   }
   cout<<"Given Array is => ";
   for(int i=0;i<n-1;i++){
      cout<<A[i]<<" ";
   }

   cout<<endl<<"Missing number is "<<m;
   return 0;
```

}
/* 2. Write the function strend(s,t), which returns 1 if the string t occurs at the end of the string s, and zero otherwise.
Sample Test case1:
Input:
s="Object Oriented Programming using C++"
t="Using C++"
Output: 1
Sample Test case2:
Input:
s="Object Oriented Programming using C++"
t="Programming"
Output: 0 */

```
#include<iostream>
#include<string.h>
using namespace std;
int strend(char s[], char t[]);
int main()
{
   char s[100],t[50];
   cout<<"Enter the the String, s = ";
   cin>>s;
   cout<<"Enter the String to be checked, t = ";
   cin>>t;
   cout<<"Output = "<<strend(s,t);
}
int strend(char s[], char t[]){
   char c[50];
   int l1,l2,k=0;
   l1=strlen(s);
   l2=strlen(t);
   for(int i=(l1-l2);(i<l1);i++,k++){
      c[k]=s[i];
   }
   c[k]='\0';
   if(strcmp(t,c)==0){
      return 1;
   }
   else{
      return 0;
   }
```

}

Lab Exercise 2: Revisiting C

/* 1. Write a function that finds the minimum and the maximum value in an array of N integers. Inputs to
the function are the array of integers, an integer variable containing the length of the array and pointers
to integer variables that will contain the minimum and the maximum values.The function prototype is:
void minmax(int array[], int length, int * min, int * max);
Write a main function that uses this function to find and display the minimum and the maximum values of an
array of integers. */

```
#include<iostream>
using namespace std;
int minmax(int ar[],int l, int *min,int *max);
int main(){
   int n,max=INT32_MIN,min=INT32_MAX;
   cout<<"Enter the Number of Elements = ";
   cin>>n;
   int ar[n];
   cout<<"Enter the values"<<endl;
   for(int i=0;i<n;i++){
      cin>>*(ar+i);
   }
   minmax(ar,n,&min,&max);
   cout<<endl<<"maximum value = "<<max;
   cout<<endl<<"minimum value = "<<min;
}
int minmax(int ar[],int l, int *min,int *max){
   for(int i=0;i<l;i++){
      if(ar[i]<*min){
         *min=ar[i];
      }
      if(ar[i]>*max){
         *max=ar[i];
      }
      cout<<"min= "<<*min<<" max= "<<*max<<endl;
   }
   return 0;
}
```

// 2. Write a program to generate random numbers in given range [m, n].
// Test case :
// Input: m=10, n=50
// Output: 34

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
void main () {
  int i,m,n;
  time_t t;
  printf("Enter the Range = ");
  scanf("%d %d",&m,&n);
  srand((unsigned)time(&t));
  for( i = m ; i < n ; i++ ) {
    printf("%d\n", rand() % n);
  }
}
```

//3. Write a function to reverse an array of long double types. Call this function from main function.

```
#include<stdio.h>
int n;
int rev(long double ar[]);
int main(void){
   printf("Enter the Array Size = ");
   scanf("%d",&n);
   long double arr[n];
   printf("Enter the Values of array=>");
   for(int i=0;i<n;i++){
      scanf("%Lf",&arr[i]);
   }
   rev(arr);
   return 0;
}
int rev(long double ar[]){
   for(int i=0;i<n/2;i++){
      int t=ar[i];
      ar[i]=ar[n-1-i];
      ar[n-1-i]=t;
```

```
    }
    for(int i=0;i<n;i++){
        printf("%Lf\n",ar[i]);
    }
    return 0;
}
```

//4. Write a program to perform the addition of two matrices.

```
#include<stdio.h>
void main(){
    int A[3][3]={{1,2,3},{4,5,6},{7,8,9}};
    int B[3][3]={{9,8,7},{6,5,4},{3,2,1}};
    int ApB[3][3];
    for(int i=0;i<3;i++){
        for(int j=0;j<3;j++){
            ApB[i][j]=A[i][j]+B[i][j];
        }
    }
    for(int i=0;i<3;i++){
        for(int j=0;j<3;j++){
            printf("%d ",ApB[i][j]);
        }
        printf("\n");
    }
}
```

Advance practice problems-

```
/* 1. Write a C++ program to find the highest occurring digit in prime numbers in a given range.
    Given a range L to R, the task is to find the highest occurring digit in prime numbers lie between L
   and R (both inclusive). If multiple digits have same highest frequency print the largest of them.
   If no prime number occurs between L and R, output -1.
   Examples:
   Input : L = 1 and R = 20.
   Output : 1
   Prime number between 1 and 20 are 2, 3, 5, 7, 11, 13, 17, 19.
   1 occur maximum i.e 5 times among 0 to 9.*/
#include<stdio.h>
static int nf[10];
int frq(int n){
```

```
  static int n0=0,n1=0,n2=0,n3=0,n4=0,n5=0,n6=0,n7=0,n8=0,n9=0;
  for(int i=0;n>0;i++){
    int rm=n%10;
    n=n/10;
            rm==0?nf[0]++:(rm==1?nf[1]++:(rm==2?nf[2]++:(rm==3?nf[3]++:(rm==4?nf[4]++:
(rm==5?nf[5]++:(rm==6?nf[6]++:(rm==7?nf[7]++:(rm==8?nf[8]++:(rm==9?nf[9]++:n9)))))))));
  }
}
int main(){
  int l,r,ele,max=0;
  nf[10]=0;
  printf("Enter the Range from L = ");
  scanf("%d",&l);
  printf("To = ");
  scanf("%d",&r);
  for(int i=l+1;i<r;i++){
    int d=0;
    for(int j=1;j<r;j++){
      if(i%j==0)
        d++;
    }
    if(d<=2){
      frq(i);
    }
  }
  for(int i=0;i<10;i++){
    if(nf[i]>=max){
      max=nf[i];
      ele=i;
    }
  }
  printf("%d",ele);
  return 0;
}
```