CMR Engineering College

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2022-26_I_CS_B_C Programming Lab

C PROGRAMMING LAB_EXERCISE_LOOPING STATEMENTS

Attempt : 1
Total Mark : 100
Marks Obtained : 92

Section 1 : CODING

1. About 2000 years ago there was some war, and during one of its battles defendants were blocked by attackers in the cave.

To avoid capture they decided to stand in a circle and kill each third until only one person remains - who was supposed to commit suicide - though he eventually prefer to surrender to enemies

Your task is to determine for given number of people N and constant step K the position of a person who remains the last - i.e. the safe position. For example if there are 10 people and they eliminate each third:

N = 10, K = 3

sequence of counting looks like this (brackets show persons who are elimintated):

1st round: 1 2 (3) 4 5 (6) 7 8 (9) 10

2nd round: 1 (2) 4 5 (7) 8 10

3rd round: (1) 4 5 (8) 10

4th round: 4 (5) 10

5th round: 4 (10)

so the "winner" is one who was #4 at initial standing.Initial numbering starts from 1.

Answer

```
#include<stdio.h>
int main(){
    int count, step;
    scanf("%d%d",&count,&step);
    int a[count];
    for(int i=0; i<count; i++) a[i]=i+1;
    int elim=0;
    int i=0;
    int j=0;
    while(elim<count-1){
        if(a[i]==0){
            i++;
            if(i==count)    i=0;
            continue;
        }
        else{
            j++;
        }
        if(j%step==0){
            a[i]=0;
            elim++;
        }
        i++;
        if(i==count)    i=0;
    }
    for(int i=0; i<count; i++) if(a[i]) printf("%d",a[i]);
}
```

Status : Correct ***Marks : 10/10***

2. Write a program to display all the factors of given number.

Answer

```
#include<stdio.h>
int main(){
```

```
    int num;
    scanf("%d",&num);
    printf("1");
    for(int i=2; i<=num; i++) if(num%i==0) printf(" %d",i);
}
```

Status : Correct **Marks : 10/10**

3. Ragu is attending his placement test online. He wants to write a code to find the sum of a series. Write a program for the same. The series is

1/1! + 2/2! + 3/3! + 4/4! +…….+ n/n! .

Answer

```
#include<stdio.h>
unsigned factorial(int num);
int main(){
    int n;
    scanf("%d",&n);
    float sum=0;
    for(int i=1;i<=n;i++) sum+=i/(float)factorial(i);
    printf("%.2f",sum);
}
unsigned factorial(int num){
    return num==0 || num==1 ? 1 : num*factorial(num-1);
}
```

Status : Correct **Marks : 10/10**

4. Seetha, a Maths teacher taught her students about the multiplication table. Seetha decides to give chocolate to the students, who write the multiplication table of the given number. She asked the student to write the result of multiplied value as shown in the sample output. Help the students to get chocolate.

Answer

```
#include<stdio.h>
int main(){
    int n;
```

```
    scanf("%d",&n);

    for(int i=1;i<=n;i++){
        for(int j=1;j<=n;j++) printf("%d ",j*i);
        printf("\n");
    }
}
```

Status : Correct **Marks : 10/10**

5. Tile Game

In connection to the National Mathematics Day celebration, the Regional Mathematical Scholars Society had arranged for a Mathematics Challenge Event where school kids participated in large number. Many interesting math games were conducted, one such game that attracted most kids was the tile game where the kids were given 'n' square tiles of the same size and were asked to form the largest possible square using those tiles.

Help the kids by writing a program to find the area of the largest possible square that can be formed, given the side of a square tile (in cms) and the number of square tiles available.

Answer

```
#include<stdio.h>
int main(){
    int sidelen, n;
    scanf("%d%d",&sidelen,&n);
    int i;
    for(i=0; i*i<=n; i++)    if(1==0) break;
    i-=1;
    printf("Area of the largest possible square is %dsqcm",sidelen*sidelen*i*i);
}
```

Status : Correct **Marks : 10/10**

6.

Ankith was not able to identify the sequence in the above image. He asked his friends to identify the sequence and help him. His friend Karthick

identified the sequence and ready to help. But Karthick is not good at coding. Help Karthick by writing the program to print the series.

Answer

```
using System;
   public class FiibonacciExample
   {
      public static void Main(string[] args)
      {
       int n1=0,n2=1,n3,i,number;
       number = int.Parse(Console.ReadLine());
       Console.Write(n1+" "+n2+" "); //printing 0 and 1
       for(i=2;i<number;++i) //loop starts from 2 because 0 and 1 are already
printed
       {
        n3=n1+n2;
        Console.Write(n3+" ");
        n1=n2;
        n2=n3;
       }
    }
   }
```

Status : Correct ***Marks : 10/10***

7. An election is contested by 5 candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a “spoilt ballot” and the program should also count the number of spoilt ballots.

Answer

```
#include<stdio.h>
int main(){
   int n;
   scanf("%d",&n);
   int votes[n];
   for(int i=0;i<n;i++) scanf("%d",votes+i);
```

```
    int candidate[6];
    for(int i=0;i<n;i++){
        switch(votes[i]){
            case 1:candidate[0]++;break;
            case 2:candidate[1]++;break;
            case 3:candidate[2]++;break;
            case 4:candidate[3]++;break;
            case 5:candidate[4]++;break;
            default: candidate[5]++;
        }
    }
    for(int i=0;i<5;i++){
        printf("Candidate %d : %d\n",i+1,candidate[i]);
    }
    printf("Invalid votes : %d",candidate[5]);
    if(0){}
}
```

Status : Correct **Marks : 10/10**

8. A Hailstone series is defined as follows: start with any integer value greater than 0, say x. If x is even, then the next value in the series is x/2; if x is odd, then the next value in the series is 3x + 1. Now apply the same rules to create the next value in the series, and so on.

Answer

```
#include<stdio.h>
int main(){
    int init,count;
    scanf("%d%d",&init,&count);

    for(int i=0;i<count;i++){
        printf("%d ",init);
        init=init%2?3*init+1:init/2;
    }
}
```

Status : Correct **Marks : 10/10**

9. When a particular range is given to Kyle, he writes down the all the values within that range which consists of unique digits. For example if the range 10-30 is given, the he writes down all the values except 11 and 22 since their digits are repeated. However when large ranges are given, he finds it difficult to identify the numbers. Help him by writing a code that prints all the values in the range that satisfy the given condition.

Answer

```
#include<stdio.h>
void printUnique(int l, int r);
int main(){
   int s,e;
   scanf("%d%d",&s,&e);
   printUnique(s,e);
}
void printUnique(int l, int r)
{
   // Start traversing the numbers
   for (int i=l ; i<=r ; i++)
   {
      int num = i;
      int visited[10] = {0};

      // Find digits and maintain its hash
      while (num)
      {
         // if a digit occurs more than 1 time
         // then break
         if (visited[num % 10])
            break;

         visited[num%10] = 1;

         num = num/10;
      }

      // num will be 0 only when above loop
      // doesn't get break that means the
      // number is unique so print it.
      if (num == 0)
         printf("%d ",i);
```

```
    }
}
```

Status : Partially correct **Marks : 2/10**

10. The car number plate number is a number in the range of 0001 to 9999. Get the current number (Can be any number in the range 1 - 9999) and display the next nice numbers you like next after the current number.

You want a number that holds the following rule:

First two digit and third & forth digit are same.(Ex.1212)

Answer

```
#include<stdio.h>
#include<math.h>
int digit(int num, int revpos);
int main(){
    int carno;
    scanf("%d",&carno);

    for(int i=carno; i<=9999; i++)
        if(digit(i,4)==digit(i,2) && digit(i,3)==digit(i,1))
            printf("%d\n",i);

}
int digit(int num, int revpos){
    num=num/pow(10,revpos-1);
    return num%10;
}
```

Status : Correct **Marks : 10/10**