Programming Laboratory: C programming
Second semester BCA and BSc Computer Science (2022-2023)

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1. To Write a C program to find the sum of digits and the reverse of a number.

```c
#include<stdio.h>
void main()
 {
  int num,sum=0,rev=0,d;
  printf("Enter the number: ");
  scanf("%d",&num);
  while(num)
    {
      d=num%10;
      num=num/10;
      sum=sum+d;
      rev=rev*10+d;
    }
 printf("Sum of digits = %d",sum);
 printf("\nReverse of the number = %d",rev);
}
```

....

2. To Find first n Fibonacci numbers

```c
#include<stdio.h>
void main()
{
  int a = 0, b = 1, c, num, count = 0;
  printf("Enter the value of num : ");
  scanf("%d", &num);
  printf("First %d FIBONACCI numbers are ...\n", num);
```

```c
  printf("%d\n", a);
  printf("%d\n", b);
  count = 2;
  while (count < num)
   {
     c = a + b;
     count++;
     printf("%d\n", c);
     a = b;
     b = c;
   }
}
```

....

3. To Create a pyramid using '*'

```c
#include <stdio.h>
void main()
 {
   int i, space, rows, k=0;
   printf("Enter number of rows: ");
   scanf("%d",&rows);
   for(i=1; i<=rows; ++i, k=0)
     {
      for(space=1; space<=rows-i; ++space)
       {
         printf(" ");
       }
    while(k != 2*i-1)
     {
      printf("* ");
      ++k;
     }
    printf("\n");
```

```
      }
}
```

....

4. To Find the number of words in a sentence

```
#include<stdio.h>
void main()
 {
   char s[200];
   int count = 0, i;
   printf("enter the string\n");
   gets(s);
   for (i = 0;s[i] != '\0';i++)
    {
     if (s[i] == ' ')
       count++;
    }
  printf("number of words in given string are: %d\n", count + 1);
}
```

....

5. To Check whether a number is prime or not

```
#include <stdio.h>
void main()
{
  int n, i, flag = 0;
  printf("Enter a positive integer: ");
  scanf("%d", &n);
  for (i = 2; i <= n / 2; ++i)
   {
     if (n % i == 0)
```

```c
     {
       flag = 1;
       break;
     }
 }
if(n == 1)
  {
    printf("1 is neither prime nor composite.");
  }
else
  {
    if (flag == 0)
       printf("%d is a prime number ", n);
    else
       printf("%d is not a prime number ", n);
  }
}
```

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6. Perform matrix transpose

```c
#include<stdio.h>
void main()
 {
   int r, c, i, j, matrix[10][10], transpose[10][10];
   printf("Enter the number of rows and columns of matrix\n");
   scanf("%d%d", &r, &c);
   printf("Enter elements of the matrix\n");
   for (i = 0; i < r; i++)
   {
   for(j = 0; j < c; j++)
    {
      scanf("%d", &matrix[i][j]);
    }
```

```c
  }
 for (i = 0; i < r; i++)
  {
   for( j = 0 ; j < c ; j++ )
    {
    transpose[j][i] = matrix[i][j];
    }
  }
 printf("Transpose of the matrix:\n");
 for (i = 0; i < r; i++)
  {
   for (j = 0; j < c; j++)
    {
     printf("%d\t", transpose[i][j]);
    }
  printf("\n");
  }
}
```

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7. To Find the sum of the series S = 1 + (1⁄2)2 + (1/3)3 +.... to 0.0001% accuracy.

```c
#include<stdio.h>
#include<math.h>
void main()
 {
  int n,i;
  double sums = 0.0, ser;
  printf("Enter the limit :");
  scanf("%d",&n);
  for (i = 1; i <= n; i++)
   {
    ser = 1 / pow(i, i);
    sums += ser;
```

```
  }
 printf("%.5f", sums);
}
```

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8. To Create a pattern with the number N.

        E.g. N = 39174 Pattern:

3	9	1	7	4
9	1	7	4	
1	7	4		
7	4			
4				

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9. Display the short form of a string. E.g. Computer Science : CS

```
#include<stdio.h>
void main()
 {
  int i,j,k;
  char a[30], b[30];
  puts("enter a string : \n");
  gets(a);
  printf("\nshort form of the string is : %c",a[0]);
  for(i=0 ; a[i] != '\0' ; i++)
   {
    if(a[i] ==' ' )
     {
       printf("%c", a[i+1]);
     }
   }
 }
}
```

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10. Find the currency denomination of a given amount.

```c
#include <stdio.h>
void main()
 {
   int amount;
   int note2000,note1000,note500, note100, note50, note20, note10, note5, note2,  note1;
   note2000=note1000=note500 = note100 = note50 = note20 = note10 = note5 =
note2 = note1 = 0;
   printf("Enter amount: ");
  scanf("%d", &amount);
  if(amount >= 2000)
   {
    note2000 = amount/2000;
    amount = amount- note2000 * 2000;
   }
 if(amount >= 1000)
  {
   note1000 = amount/1000;
   amount = amount -note1000 * 1000;
  }
if(amount >= 500)
  {
   note500 = amount/500;
   amount = amount- note500 * 500;
 }
if(amount >= 100)
 {
  note100 = amount/100;
  amount = amount -note100 * 100;
 }
if(amount >= 50)
```

```
   {
    note50 = amount/50;
    amount = amount -note50 * 50;
   }
  if(amount >= 20)
   {
    note20 = amount/20;
    amount = amount -note20 * 20;
   }
  if(amount >= 10)
   {
    note10 = amount/10;
    amount = amount- note10 * 10;
   }
  if(amount >= 5)
   {
    note5 = amount/5;
    amount = amount- note5 * 5;
   }
  if(amount >= 2)
   {
    note2 = amount /2;
    amount = amount- note2 * 2;
   }
  if(amount >= 1)
   {
    note1 = amount;
   }

  printf("Total number of notes = \n");
  printf("2000 = %d\n", note2000);
  printf("1000 = %d\n", note1000);
  printf("500 = %d\n", note500);
  printf("100 = %d\n", note100);
  printf("50 = %d\n", note50);
```

```
printf("20 = %d\n", note20);
printf("10 = %d\n", note10);
printf("5 = %d\n", note5);
printf("2 = %d\n", note2);
printf("1 = %d\n", note1);
}
```

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11. Find the Armstrong numbers within a given range.

```c
#include<stdio.h>
void main()
 {
  int low, high, i, num, temp, r,sum;
  printf("Enter two numbers (intervals): ");
  scanf("%d %d", &low, &high);
  printf("Armstrong numbers between %d an %d are: ", low, high);
  for(i = low + 1; i < high; ++i)
   {
    sum=0;
    num = i;
    temp = i;
    while(temp>0)
     {
      r=temp  % 10;
       sum=sum+(r*r*r);
      temp=temp/10;
     }
  if(sum= =num)
   {
    printf("%d\t",sum);
   }
 }
}
```

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12. Find the factorial of a number using recursion

```c
#include<stdio.h>
int factorial(int n)
 {
   if (n == 0)
     return 1;
  else
    return(n * factorial(n-1));
 }
 void main()
  {
    int number;
    int fact;
    printf("Enter a number: ");
    scanf("%d", &number);
    fact = factorial(number);
    printf("Factorial of %d is %d\n", number, fact);
 }
```

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13. Check for palindrome string

```c
#include <string.h>
#include<stdio.h>
void main()
{
  char s[1000];
  int i,n,c=0;
  printf("Enter the string : ");
  gets(s);
  n=strlen(s);
```

```c
 for(i=0;i<n/2;i++)
  {
   if(s[i]==s[n-i-1])
   c++;
  }
if(c==i)
 printf("string is palindrome");
else
 printf("string is not palindrome");
}
```

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14. Write a c program to check the year is leap year or not

```c
#include<stdio.h>
void main()
 {
  int year;
  printf("Enter a year: ");
  scanf("%d",&year);
  if(year%4 == 0)
   {
   if( year%100 == 0)
    {
    if ( year%400 == 0)
      printf("%d is a leap year.", year);
    else
      printf("%d is not a leap year.", year);
    }
   else
    printf("%d is a leap year.", year );
   }
else
```

```c
    printf("%d is not a leap year.", year);
}
```

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15. Write odd and even numbers into separate files.

```c
#include<stdio.h>
void main()
 {
  FILE *fp,*fp1,*fp2;
  int c,i;
  fp=fopen("data","w");
  printf("enter the numbers");
  for(i=0;i<10;i++)
   {
    scanf("%d",&c);
    putw(c,fp);
   }
  fclose(fp);
  fp=fopen("data","r");
  fp1=fopen("even","w");
  fp2=fopen("odd","w");
  while((c=getw(fp))!=EOF)
   {
   if(c%2==0)
     putw(c,fp1);
   else
     putw(c,fp2);
   }
 fclose(fp);
 fclose(fp1);
 fclose(fp2);
 printf("\nEven Numbers are :");
 fp1=fopen("even","r");
```

```c
while((c=getw(fp1))!=EOF)
  printf("%d\t",c);
printf("\nOdd Numbers are :");
fp2=fopen("odd","r");
while((c=getw(fp2))!=EOF)
  printf("%d\t",c);
fclose(fp1);
fclose(fp2);
}
```

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16. Write a c program to display base conversion of numbers

```c
#include<stdio.h>
void main()
 {
 int b,n,i,r,digit,p,count=0;
 char a[100];
 printf("\nEnter the decimal number:\n");
 scanf("%d",&n);
 printf("\nEnter the base to be converted:\n");
 scanf("%d",&b);
 p=n;
 do
 {
  r=p%b;
  digit='0'+r;
  if(digit>'9')
  digit=digit+7;
  a[count]=digit;
  count++;
  p=p/b;
 } while(p!=0);
 printf("\nbase %d equivalent of num %d is ",b,n);
```

```c
  for(i=count-1;i>=0;--i)
  printf("%c",a[i]);
  printf(".\n");
}
```

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17. Write a c program to merge two numeric arrays in sorted order

```c
#include<stdio.h>
void sort(int merge[],int n)
 {
   int i,j;
   for(i=0;i<n;i++)
   {
     int temp;
     for(j=i+1;j<n;j++)
     {
      if(merge[i]>merge[j])
      {
       temp=merge[i];
       merge[i]=merge[j];
       merge[j]=temp;
      }
     }
   }
}
void main()
 {
  int arr1[50], arr2[50], size1, size2, i, k, merge[100],n;
  printf("Enter Array 1 Size: ");
  scanf("%d", &size1);
  printf("Enter Array 1 Elements: ");
  for(i=0; i<size1; i++)
   {
```

```c
    scanf("%d", &arr1[i]);
    merge[i] = arr1[i];
  }
 k = i;
 printf("\nEnter Array 2 Size: ");
 scanf("%d", &size2);
 printf("Enter Array 2 Elements: ");
 for(i=0; i<size2; i++)
  {
   scanf("%d", &arr2[i]);
   merge[k] = arr2[i];
   k++;
  }
 printf("\nThe new array after merging is:\n");
 for(i=0; i<k; i++)
  {
   printf("%d ", merge[i]);
  }
 n=size1+size2;
 printf("\nAfter sorting...\n");
 sort(merge,n);
 for(i=0 ; i<n ; i++)
  {
   printf(" %d ",merge[i]);
  }
 }
```

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18. Write a c program to fill upper triangle with 1,lower triangle with -1 and diagonal elements with 0.

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

```c
    int rows, i, j,count;
    printf("Enter number of rows: ");
    scanf("%d", &rows);
    count=rows;
    for(i=1; i<=rows; i++)
     {
      for(j=1;j<=rows;j++)
       {
        if(j==count)
         {
           printf("\t 0");
         }
        else if(j<count)
         {
          printf("\t 1");
         }
       else
        {
         printf("\t-1");
        }
      }
    }
     count--;
     printf("\n");
    }
    }
```

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