Sem 1 Labbook Programs

Exercise 1

2)

/*Write a program to accept a single character from the keyboard and display its two places previous and two places next character in order.

Ex. If the character entered is 'd', display "The previous character is b", "The next character is f".*/

```
#include<stdio.h>
int main()
{
   char ch;
   printf(" Enter a character: \n");
   scanf("%c",&ch);
   printf(" previous character to %c is %c and next character to %c is %c", ch, ch-2, ch, ch+2);
   return 0;
}
```

---

3)

/*Write a program to read the price of an item in decimal form and print the output in paise.

(Hint: Price = 16.95 Output:1695 paise)*/

```
#include<stdio.h>
int main()
{
   float Rs;
   int Ps;
   printf("enter a prince in rupees: \n");
   scanf("%f",&Rs);
```

```
    Ps= Rs*100;
    printf(" Price in paise is %d",Ps);
    return 0;
}
```

---

4) Write a program to accept current reading and last reading of electricity of a customer. Use following criteria for rate per unit to calculate the electricity bill.

Unit < 100, then rupees 3 per units

Unit > 100 and <=200, then rupees 3.5 per units

Unit > 200 and <=350, then rupees 4 per units

Unit > 350 and <= 500, then rupees 4.5 per units

Unit > 500, then 5 rupees for each unit.

```
#include <stdio.h>
int main()
{
    int cr, lr, u;
    float b;
    printf("cureent reading is: ");
    scanf("\n %d",&cr);
    printf("\n last reading is: ");
    scanf(" \n %d",&lr);
    u=cr-lr;
    if(u<100)
```

```
  {
  b=u*3;
  printf("amount of bill is %f",b);
  }
  else if(u>100 & u<=200)
 {
  b=u*3.5;
  printf("amount of bil is %f",b);
 }
else if (u>200& u<=350)
 {
  b=u*4;
  printf("amount of bill is %f",b);
 }
else if(u>350&u<=500)
{
 b=u*4.5;
 printf("amount of bill is %f",b);
}
else
 {
     b=u*5;
     printf("amount of bill is %f",b);
 }
 return 0;
```

```
}
```

6)

/*5. Write a program to accept three numbers and check whether the first is in between the other two numbers. Ex: Input 20 10 30. Output: 20 is between 10 and 30*/

```
#include<stdio.h>
int main()
{
   int a, b, c;
   printf("enter a three numbers: ");
   scanf("%d %d %d",&a,&b,&c);
   if(b>a & b<c)
   {
      printf("%d is in between %d and %d",b,a,c);
   }
   else
   {
      printf("%d is not between %d and %d",b,a,c);
   }
   return 0;
}
```

6)

/*Accept two numbers in variables x and y from the user and perform the following

operations

Options Actions

1.Equality =Check if x is equal to y

2. Less Than =Check if x is less than y

3. Quotient and Remainder= Divide x by y and display the quotient and remainder*/

```
#include<stdio.h>
int main()
{
   int x, y,q,r;
   char ch;
   printf("enter a two number: \n");
   scanf("%d %d",&x,&y);
   printf("enter a option like A: equality, B:Less than, C:Quatient and remainder:\n");
  scanf("%c",&ch);
  switch(ch)
   {
      case 'A' :  if(x==y)
```

```
                printf("x is equal to y\n");
                else
                printf("x is not equal to y \n");
                 break;
      case 'B' :  if(x<y)
                 printf("x is less than y\n");
                 else
                 printf("x is not less than y \n");
                 break;
      case 'c':   q=x/y;
                 r=x%y;
                 printf("Quatient= %d and Remaindr= %d\n",q, r);
                 break;
      default :  printf("please enter appropriate option.");
                 break;
   }


}
```

Exercise 2:

1)

/*.1. Write a program to accept two integers x and n and compute x^n using loop.*/

```
#include<stdio.h>
int main()
{
   int x,n,i;
   int xn=1;
   printf("enter value of base and and power: ");
   scanf("%d %d",&x,&n);
   for(i=1;i<=n;i++)
   {
      xn=xn*x;
   }
    printf("enter value of x^n=%d",xn);
    return 0;
}
```

2)

/*2. Write a program to accept an integer and check if it is prime or not. */

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

```
    int a,i, flag=0;
    printf("enter a number: \n");
    scanf("%d",&a);
    for(i=2;i<a;i++)
    {
       if(a%i==0)
       flag= 1;
    }
    if(flag==0)
    printf("the number is prime");
    else
    printf("the number is not prime");
    return 0;
}
```

3)

/*Write a program to accept an integer and check if it is palindrome or not. Ex.12321*/

```
#include<stdio.h>
int main()
{
    int n,m,i,r,rev=0;
    printf("enter a number: \n");
    scanf("%d",&n);
    n=m;
    for(i=1;i<=5;i++)
```

```
  {
     r=n%10;
     rev=rev*10+r;
     n=n/10;
  }
  if(rev==m)
  printf("the number is palindrome");
  else
  printf("the number is not palindrome");
  return 0;
}
```

4)

/*Write a program to display multiplication tables from x to y having n multiples each. The output should be displayed in a tabular format. For example, the multiplication tables of 2 to 9 having 10 multiples each are shown below. (Batch teacher should supply values of x and y along with n)

2 *1 =2 3 *1=3 ----- ------- 9 *1=9

2 *2=4 3 *2=6 ----- ------- 9*2=18

-------- --------- ----- ------- --------

-------- --------- ----- ------- --------

2 *10=20 3*10=30 ----- ------- 9*10=90

***/**

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

```
{
   int x,y,i,j;
   printf("enter a numbers for x to y: ");
   scanf("%d %d",&x,&y);
   for(i=1;i<=10;i++)
   {
      for(j=x;j<=y;j++)
       {
          printf("%d * %d = %d \t",j,i,j*i);
       }
       printf("\n");
   }
   return 0;
}
```

---

5)

/*Write a program to print n lines of Floyd's Triangle the following pattern. e.g.=5

1

2 3

4 5 6

7 8 9 10

11 12 13 14 15 */

```
#include<stdio.h>

int main()

{

   int n,i,j,b=1,m=0;

   printf("enter a number:");

   scanf("%d",&n);

   for(i=1;i<=n;i++)

   {

      m=m+i;

      for(j=b;j<=m;j++)

       {

         printf("%d\t",b);

        b++;

       }

         printf("\n");

 }

 return 0;

}
```

6)

/*6. Write a program to find the sum of the following series:

X^1/1 + X^2/2 + X^3/3 +……+X^n/n

***/**

```
#include <stdio.h>

int main()
```

```
{
   int x,n,i;
   float m=1,s=0;
   printf("enter a number x and n:");
   scanf("%d %d",&x,&n);
   for(i=1;i<=n;i++)
   {
      m=m*x;
      s=s+m/i;
   }
   printf("sum of series=%f",s);
}
```

Exercise 3 :

1)

/*1.Write a menu driven program to perform the following operations on a character type variable.

i. Check if it is an alphabet

ii. Check if it is a digit. If it is a digit find its cube (Use math.h)

iii. Check if it is a lowercase alphabet. Display its next character inuppercase.

iv. Check if it is a uppercase alphabet. Display its next character inlowercase.

v. Exit*/

```
#include<stdio.h>
#include<math.h>
#include<ctype.h>
```

```
#include<stdlib.h>

int main()

{

   char c;

   int opt;

   int n,cub=0;


   printf("enter a character: ");

   scanf("%c",&c);

 printf("choose given below option \n 1.Check if it is an alphabet\n 2.Check whether it is a digit. If it is a digit find its cube (Use math.h)\n 3.Check whether it is a lowercase alphabet. Display its next character inuppercase.\n 4.Check whether it is a uppercase alphabet. \n5.Display its next character inlowercase.\n5.Exit\n");


   scanf("%d",&opt);

   switch(opt)

   {

      case 1:   if(isalpha(c))

                printf("an entered character is alphabet");

                else

                printf("an entered character is not alphabet");

                break;

      case 2:   if(isdigit(c))

               {

                 n=atoi(&c);

                 printf("an entered character is a digit, so cube of its is %d",cub=pow(n,3));

                }
```

```
            else
            printf("an entered character is a digit");
            break;
    case 3:  if(islower(c))
            printf("an entered character is in lowercase and uppercase case of its next charcter is %c",c=toupper(c+1));
            else
            printf("an entered character is not in lowercase");
            break;
    case 4:  if(isupper(c))
             printf("an entered character is in uppercase and lowercase case of its next charcter is %c",c=tolower(c+1));
            else
           printf("an entered character is not in uppercase");
            break;
    case 5: exit(1);
  }
}
```

2)

/*Write a menu driven program to perform the following operations till the user selects

Exit. Accept appropriate data for each option. Use standard library functions from math.h.

i. sine

ii. cosine

iii. log

iv. ex

v. square root

vi. Exit */

```
#include<stdio.h>
#include<math.h>
#include<stdlib.h>
int main()
{
   int n,opt;
   float s=0;
   printf("enter a number:");
   scanf("%d",&n);
   printf("select following option 1. sine, 2.cosine, 3. log, 4.ex, 5. square root, 6. Exit");
   scanf("\n %d",&opt);
   switch(opt)
   {
      case 1:   s= sin(n);
                printf("sine of entered number is %f",s);
                break;
      case 2:  s= cos(n);
               printf("cosine of entered number is %f",s);
               break;
      case 3:  s= log(n);
               printf("log of entered number is %f",s);
```

```
            break;
    case 4: s= exp( n);
            printf("exponential of n is %f",s);
            break;
    case 5: s= sqrt(n);
             printf("square root of n is %f",s);
             break;
    case 6: exit(1);
  }
 }
```

Exercise 4:

1)

/*1. Write a function Max, which accept two integers as parameters and returns maximum number to the calling function. Use this function in main to accept 3 numbers. */

```
#include<stdio.h>
int Max(int x,int y);
int main()
{
   int a,b,c,m=0;
   printf("enter a numbers:\n");
   scanf("%d %d %d",&a,&b,&c);
   m=Max(a,b);
   m=Max(m,c);
```

```
    printf("maximum of three numbers is %d",m);


}
   int Max(int x,int y)
{
    if(x>y)
    {
    return x;


    }
    else
    {
    return y;
    }
}
```

---

2)

/*Write a function isPrime, which accepts an integer as parameter and returns 1 if the number

is prime, 0 otherwise. Use this function in main to accept n numbers and check if they are

prime or not. (Till user Quit) */

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

```
{
   int n;
   int flag;
   printf("enter a number:");
   scanf("%d",&n);
   flag=isprime(n);
   if(flag==0)
   {
    printf("the number is not prime");
    }
   else
   {
    printf("the number is  prime");
   }
   return 0;

}

int isprime(int x)
{
   int i,f=1;
   for(i=2;i<x;i++)
   {
      if(x%i==0)
```

```
    {
      f=0;
      break;
    }
  }
    if(f==0)
    {
      return 0;
    }
    else
    {
      return 1;
    }

}
```

3)

/*Write a menu driven program, which accepts two integers and single character out of a, s, m,

d and calls the corresponding functions to perform the following operations and displays the result (Write separate functions for each character).

A/a–Addition M/m–Multiplication

S/s–Subtraction D/d–Division

E/e – Exit Otherwise-Invalid input */

```
#include<stdio.h>

#include<stdlib.h>

int add(int,int);

int divi(int,int);

int mult(int, int);

int sub(int, int);


int main()

{

   int a,b,ad=0, sb=0, mt=0, di=0;

   char ch;

   printf("enter a two numbers: ");

   scanf("%d %d",&a,&b);

   printf("choose a option as follows:\n A/a-Addition\n S/s-Substraction\n M/m-
Multiplication\n D/d-Division\n E/e-exit\n");

   scanf("%c",&ch);

   switch(ch)

   {

      case 'A'  :

      case 'a'  :  ad=add(a,b);

                   printf("Addition=%d",ad);

                   break;
```

```
      case 'S'  :
      case 's'  :  sb=sub(a,b);
                   printf("substaction=%d",sb);
                   break;

      case 'M'  :
      case 'm'  :   mt=mult(a,b);
                    printf("Multiplication=%d",mt);
                    break;
      case 'D'  :
      case 'd'  :   di=divi(a,b);
                    printf("division=%d",di);
                    break;

      case 'E'  :
      case 'e'  :   exit(1);
                   break;

      default   :   printf("invalid input");

   }
}
int add(int x,int y)
{
```

```
    int ad=0;
    ad=x+y;
    return ad;
}
int sub(int x, int y)
{
    int sb=0;
    sb=x-y;
    return sb;
}
int mult(int x, int y)
{
    int mt=0;
    mt=x*y;
    return mt;
}
int divi(int x, int y)
{
    int di=0;
    di=x/y;
    return di;
}
```

4)

/*Write a recursive C function to calculate the sum of digits of a number till you get a single digit number. Use this function in main to accept a number and print sum of its digits.*/

```
#include<stdio.h>
int sum(int);
int main()
{
   int n,s=0;
   printf("enter a number: ");
   scanf("%d",&n);
   s=sum(n);
   printf(" sum of first %d digits is %d",n,s);

   return 0;
}

int sum(int x)
{
   if(x==0)
   return(0);
   else
   return(x+sum(x-1));
}
```

Exercise 5:

1) /*Write a program to accept n numbers in an array and display the largest and smallest number of the array.*/

```
#include<stdio.h>
int main()
{
   int n,i,S,l;
   int A[20];
   printf("how many elements do you want in array?:\n");
   scanf("%d",&n);
   printf("enter the elments: \n");
   for(i=0;i<n;i++)
   {
      scanf("%d",&A[i]);
    }

   l=A[0];
   for(i=1;i<n;i++)
   {
      if(l<A[i])
      l=A[i];
   }
 printf("greatest elements of arrays is %d\n",l);
```

```
 S=A[0];
   for(i=1;i<n;i++);
   {
      if(S>A[i])
      S=A[i];
   }
 printf("smallest elments of array is %d\n",S);
 }
```

2)

/*Write a program to accept numbers in the range of 1 to 25. Enter -1 to stop accepting the numbers from the user. Further accept a digit from the user from the given range and find the number of times that number has been entered (i.e. Hit Count of that number).*/

```
#include<stdio.h>
int main()
{
   int A[20];
   int n,i,size=0,key,count=0;
   do
   {
      printf("enter a number for range 1 to 25.\n");
      scanf("%d",&n);
```

```
    while(n>25)
    {
     printf("reenter a number\n");
         scanf("%d",&n);
     if(n=-1)
       break;
     else
     {
        A[size]=n;
       size++;
     }
    }

} while(n!=-1);

if(size==0)
    printf("there is no element to count\n");
    else
 {
    for(i=0;i<size;i++)
      printf("%d\n",A[i]);

    printf("enter a number to count\n");
    scanf("%d",&key);
```

```
    for(i=0;i<size;i++)
     {
      if(A[i]==key)
         count++;
     }
      printf("the number %d hits %d times",key,count);
  }

}
```

3)

/*Write a function, which accepts an integer array and an integer as parameters and count the occurrences of the number in that array.

Example:

Input 1 5 2 1 6 3 8 2 9 15 1 30

Number to search : 1

Output: 1 occurs 3 times */

```
#include<stdio.h>
int accept(int A[],int);
int main()
{
   int A[20], n;
   printf("how many elements do you want to enter\n");
   scanf("%d",&n);
```

```
    accept(A,n);


    return 0;
}
int accept(int x[20],int n)
{
    int i, key, count=0;
    for(i=0;i<n;i++)
    {
    scanf("%d",&x[i]);
    }
    printf("enter a number to count a hits\n");
    scanf("%d",&key);
    for(i=0;i<n;i++)
    {   if(x[i]==key)
        count++;
    }
    printf("the number %d hits a count %d times",key,count);


}
```

4)

/*Write a program to add two matrices. Write separate functions to accept, add and

```
display the matrices. */
#include<stdio.h>
int accept(int A[10][10], int r, int c);
int display(int A[10][10], int r, int c);
int add(int A[10][10],int B[10][10], int C[10][10], int r, int c);
int main()
{
   int A[10][10], B[10][10], C[10][10], r,c,i,j;
   printf("enter a number of rows and columns of matrix:\n");
   scanf("%d %d",&r,&c);
   printf("enter a matrix A:\n");
   accept(A,r,c);
   printf("enter matrix B\n");
   accept(B,r,c);
   printf("you entered the matrix A:\n");
   display(A,r,c);
    printf("you entered the matrix B:\n");
   display(B,r,c);
   printf("addition of matrices:\n");
   add(A,B,C,r,c);
   display(C,r,c);
}
int accept(int A[10][10],int r, int c)
{
```

```
   int i,j;
   for(i=0;i<r;i++)
    {
       for(j=0;j<c;j++)
       {
         scanf("%d",&A[i][j]);
       }
    }
}
int display(int A[10][10],int r, int c)
{
    int i,j;
   for(i=0;i<r;i++)
    {
       for(j=0;j<c;j++)
       {
         printf("%d\t",A[i][j]);
       }
       printf("\n");
}


}
int add(int A[10][10], int B[10][10], int C[10][10], int r, int c)
{
```

```
   int i,j;
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
      C[i][j]= A[i][j] + B[i][j];
      }
   }
}
```

5)

/*Write a program to accept a matrix A of size m X n and store its transpose in matrix B. Display matrix B. Write separate functions to do the task. */

```
#include<stdio.h>
void accept(int A[10][10],int r , int c);
void display(int A[10][10], int r, int c);
void transpose(int A[10][10], int B[10][10], int r, int c);
int main()
{
   int A[10][10],B[10][10],r,c;
   printf("please enter the size of matrix in m*n:\t");
   scanf("%d %d",&r,&c);
   printf("enter a marix A: ");
   accept(A,r,c);
```

```
    printf("you have entered the matrix:\n");
    display(A,r,c);
    printf("transpose of matrix A as follows:\n");
    transpose(A,B,r,c);
    display(B,c,r);
    }
void accept(int A[10][10], int r, int c)
{
    int i,j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
        scanf("%d",&A[i][j]);
        }
    }
}
void display(int A[10][10], int r, int c)
{
    int i,j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
```

```
        printf("%d\t",A[i][j]);
        }
        printf("\n");
    }
}
void tranpose(int A[10][10], int B[10][10], int r, int c)
{
    int i,j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            B[j][i]=A[i][j];
        }
    }
}
```

6)

/*Write a program to multiply two m X n matrices. Write separate functions to accept, multiply and display the matrices. */

```
#include<stdio.h>
int accept(int A[10][10], int r, int c);
int display(int A[10][10], int r, int c);
```

```
int multiply(int A[10][10],int B[10][10], int C[10][10], int r, int c);

int main()

{

   int A[10][10], B[10][10], C[10][10], r,c,i,j;

   printf("enter a number of rows and columns of matrix:\n");

   scanf("%d %d",&r,&c);

   printf("enter a matrix A:\n");

   accept(A,r,c);

   printf("enter matrix B\n");

   accept(B,r,c);

   printf("you entered the matrix A:\n");

   display(A,r,c);

    printf("you entered the matrix B:\n");

   display(B,r,c);

   printf("addition of matrices:\n");

   multiply(A,B,C,r,c);

   display(C,r,c);

}

int accept(int A[10][10],int r, int c)

{

   int i,j;

   for(i=0;i<r;i++)

    {

       for(j=0;j<c;j++)
```

```
        {
          scanf("%d",&A[i][j]);
        }
     }
}
int display(int A[10][10],int r, int c)
{
    int i,j;
   for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
          printf("%d\t",A[i][j]);
        }
        printf("\n");
    }
}
int multiply(int A[10][10], int B[10][10], int C[10][10], int r, int c)
{
   int i,j;
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
```

```
            C[i][j]= A[i][j] * B[i][j];
        }
    }
}
```

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