

Exercise 1: Write a program to convert English units to metric (i.e., miles to kilometers, gallons to liters, etc.). Include a specification and a code design.

```
#include<stdio.h>
int main()
{
    int choice,ch;
    float dis;
    printf("english unit to metrics \n");
    printf("1. distance \n2. weight \n3. volume \n");
    printf("enter your choice \n");
    scanf("%d",&choice);
    switch(choice)
    {
        case 1:
            printf("1. inch to meter \n2. foot to meter \n3. mile to kilometer \n");
            printf("enter your choice \n");
            scanf("%d",&ch);
            switch(ch)
            {
                case 1:
                    printf("enter the distance in inches \n");
                    scanf("%f",&dis);
                    printf("distance in meters= %0.3f",dis*0.0254);
                    break;
                case 2:
                    printf("enter the distance in feet \n");
                    scanf("%f",&dis);
                    printf("distance in meters= %0.3f",dis*0.3048);
                    break;
                case 3:
                    printf("enter the distance in mile \n");
                    scanf("%f",&dis);
                    printf("distance in kilometers= %0.3f",dis*1.60934);
                    break;
                default:
                    printf("wrong choice \n");
            }
            break;

        case 2:
            printf("1. ounce to kilogram \n2. pound to kilogram \n");
            printf("enter your choice \n");
            switch(ch)
```

```

{
    case 1:
        printf("enter the weight in ounces \n");
        scanf("%f",&dis);
        printf("weight in kilograms= %0.3f",dis*0.0283);
        break;
    case 2:
        printf("enter the weight in pounds \n");
        scanf("%f",&dis);
        printf("weight in kilograms= %0.3f",dis*0.4536);
        break;
    default:
        printf("wrong choice \n");
}
break;

case 3:
printf("1. cubic feet to cubic meters \n2. gallons to litres \n");
printf("enter your choice \n");
switch(ch)
{
    case 1:
        printf("enter the volume in cu. feet \n");
        scanf("%f",&dis);
        printf("volume in cubic meters= %0.3f",dis*0.0283);
        break;
    case 2:
        printf("enter the volume in gallons \n");
        scanf("%f",&dis);
        printf("weight in litres= %0.3f",dis*3.7854);
        break;
    default:
        printf("wrong choice \n");
}
break;

default:
    printf("wrong choice \n");
}
return 0;
}

```

---

Exercise 3: A serial transmission line can transmit 960 characters each second.

Write a program that will calculate the time required to send a file, given the file's size. Try the program on a 400MB (419,430,400 -byte) file. Use appropriate units. (A 400MB file takes days.

```
#include <stdio.h>
int main()
{
    int size;
    long bytes;
    double speed = 960.0;
    long long time_seconds, time_days, time_hours, remaining_seconds;
    printf("Enter the file size in MB: ");
    scanf("%d", &size);
    bytes = size * 1000000L;
    time_seconds = bytes/speed;
    time_days = time_seconds/86400;
    time_hours = (time_seconds % 86400) / 3600;
    remaining_seconds = (time_seconds % 86400) % 3600;
    printf("Time to transmit the file:\n");
    printf("%lld days, %lld hours, %lld seconds\n", time_days, time_hours,
remaining_seconds);
    return 0;
}
```

---

Exercise 4: Write a program to add an 8% sales tax to a given amount and round the result to the nearest penny.

```
#include<stdio.h>
int main()
{
    float amt;
    int taxed;
    printf("enter the amount \n");
    scanf("%f",&amt);
    taxed=0.08*amt+amt;
    printf("the amount after taxes= %d",taxed);
    return 0;
}
```

---

Exercise 5: Write a program to tell if a number is prime.

```
#include<stdio.h>
int main()
{
    int num,count=0;
    printf("enter a number \n");
    scanf("%d",&num);
    if(num<=0 || num==1)
    {
        printf("the number is neither prime nor composite \n");
        exit(0);
    }
    for(int i=2;i<num;i++)
    {
        if(num%i==0)
            count++;
    }
    if(!count)
        printf("the number is prime \n");
    else
        printf("the number is not prime \n");
    return 0;
}
```

---

Exercise 6: Write a program that takes a series of numbers and counts the number of positive and negative values.

```
#include<stdio.h>
int main()
{
    int n,pos=0,neg=0;
    printf("enter the number of elements of the array \n");
    scanf("%d",&n);
    int arr[n];
    printf("enter the elements \n");
    for(int i=0;i<n;i++)
    {
        scanf("%d",&arr[i]);
    }
    for(int i=0;i<n;i++)
    {
        if(arr[i]>0)
```

```

        pos++;
    else if(arr[i]<0)
        neg++;
    }
    printf("number of positive numbers= %d\nnumber of negative numbers=
%d",pos,neg);
    return 0;
}

```

---

Program to find the sum /factorial of all natural numbers given be the series

$1/1! + 2/2! + 3/3! + ..... + N/N!$

```

#include<stdio.h>
#include<stdlib.h>
int fact(int);
int main()
{
    int n;
    float sum=0.0;
    printf("enter the nth term \n");
    scanf("%d",&n);
    for(int i=1;i<=n;i++)
    {
        sum+=(float)i/(float)fact(i);
    }
    printf("sum of the series is %.3f",sum);
}
int fact(int n)
{
    int fac=1;
    if (n==1)
        return 1;
    else
    {
        for(int i=1;i<=n;i++)
        {
            fac=fac*i;
        }
        return fac;
    }
}
return 0;
}
int fact(int n)

```

```

{
    int fac=1;
    for(int j=1;j<=n;j++)
    {
        fac=fac*j;
    }
    return fac;
}

```

---

HCF of 2 numbers using recursion

```

#include <stdio.h>
int hcf(int a, int b);
int main()
{
    int num1, num2;
    printf("Enter two numbers: ");
    scanf("%d %d",&num1,&num2);
    printf("HCF of %d and %d is: %d\n", num1, num2, hcf(num1, num2));
    return 0;
}
int hcf(int a, int b)
{
    if (b == 0)
    {
        return a;
    }
    return hcf(b, a % b);
}

```

---

LCM of 2 numbers using recursion

```

#include <stdio.h>
int hcf(int a, int b);
int lcm(int a, int b);
int main()
{
    int num1, num2;
    printf("Enter two numbers: \n");
    scanf("%d %d", &num1, &num2);
    printf("The LCM of %d and %d is: %d\n", num1, num2, lcm(num1, num2));
    return 0;
}
int hcf(int a, int b)

```

```

{
    if (b == 0)
    {
        return a;
    }
    return hcf(b, a % b);
}
int lcm(int a, int b)
{
    return (a * b) / hcf(a, b);
}

```

---

Program to replace even numbers by 0 and odd numbers by 1 in 1D array

```

#include<stdio.h>
int main()
{
    int n;
    printf("enter the number of elements of the array\n");
    scanf("%d",&n);
    int arr[n];
    printf("enter the elements \n");
    for(int i=0;i<n;i++)
    {
        scanf("%d",&arr[i]);
    }
    for(int i=0;i<n;i++)
    {
        if(arr[i]%2==0)
            arr[i]=0;
        else
            arr[i]=1;
    }
    for(int i=0;i<n;i++)
    {
        printf("%d ",arr[i]);
    }
}

```

---

Program to read a matrix and print diagonal elements

```

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

```

```

int n;
printf("enter the dimension of the 2d array \n");
scanf("%d",&n);
int arr[n][n];
printf("enter the elements of the array \n");
for(int i=0;i<n;i++)
{
    for(int j=0;j<n;j++)
    {
        scanf("%d",&arr[i][j]);
    }
}
for(int i=0;i<n;i++)
{
    for(int j=0;j<n;j++)
    {
        if(i==j)
            printf("%d ",arr[i][j]);
    }
}
}

```

---

Program to print upper triangular portion of a 3x3 matrix

```

#include<stdio.h>
int main()
{
    int arr[3][3];
    printf("enter the elements of the array \n");
    for(int i=0;i<3;i++)
    {
        for(int j=0;j<3;j++)
        {
            scanf("%d",&arr[i][j]);
        }
    }
    for(int i=0;i<3;i++)
    {
        for(int j=0;j<3;j++)
        {
            if(i<=j)
                printf("%d ",arr[i][j]);
        }
        printf("\n");
    }
}

```



```
}
```

---

Program to input elements of 1d array using dynamic memory allocation and printing the sum of elements of the array

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
    int n,sum=0;
    printf("enter the number of elements of the array \n");
    scanf("%d",&n);
    int *ptr=(int *)malloc(n*sizeof(int));
    printf("enter the elements of the array \n");
    for(int i=0;i<n;i++)
    {
        scanf("%d",(ptr+i));
    }
    for(int i=0;i<n;i++)
    {
        sum+=*(ptr+i);
    }
    printf("sum of elements =%d",sum);
}
```

---

Program to input and print text using dynamic memory allocation

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
    int count=0;
    char temp[20];
    printf("enter a string \n");
    gets(temp);
    for(int i=0;temp[i]!='\0';i++)
        count++;
    char * str=(char *)malloc(++count*sizeof(char));
    for(int i=0;i<count;i++)
    {
        *(str+i)=temp[i];
    }
    printf("the string is %s",str);
}
```

---

Program to find the sum of series given by

$1 + \frac{3^2}{3^3} + \frac{5^2}{5^3} + \frac{7^2}{7^3} + \dots$  upto n terms

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
    int n;
    float sum=0.0;
    printf("enter the nth term \n");
    scanf("%d",&n);
    for(int i=1;i<=n;i+=2)
    {
        sum+= (float)(i*i)/(float)(i*i*i);
    }
    printf("sum of the series is %0.3f",sum);
}
```

---

Program to convert binary number to grey code

```
#include <stdio.h>
int main()
{
    int binary, gray;
    printf("Enter a binary number \n");
    scanf("%d", &binary);
    gray = binary^(binary >> 1);
    printf("Binary number: %d\n", binary);
    printf("Gray code: %d\n", gray);
    return 0;
}
```

---

Program to convert binary number to grey code using recursion

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

```

```

    int binary, gray;
    printf("Enter a binary number \n");
    scanf("%d", &binary);
    gray = graycode(binary);
    printf("Binary number: %d\n", binary);
    printf("Gray code: %d\n", gray);
    return 0;
}
int graycode(int binary)
{
    if (binary == 0)
    {
        return 0;
    }
    return binary^(binary>>1);
}

```

---

Program to convert decimal number to binary number using recursion

```

#include <stdio.h>
void binary(int n);
int main()
{
    int num;
    printf("Enter a decimal number \n");
    scanf("%d", &num);
    printf("Binary representation \n");
    binary(num);
    printf("\n");
    return 0;
}
void binary(int n)
{
    if (n==0)
        return;
    binary(n/2);
    printf("%d",n%2);
}

```

---

Program to print the pattern

\* \* \* \* \*

\* \* \* \*   \* \* \* \*

\* \* \*   \* \* \*

\* \*   \* \*

\*   \*

```
#include <stdio.h>

int main()
{
    for (int i = 0; i < 5; i++)
    {
        for (int j=0;j<5-i;j++)
        {
            printf("* ");
        }
        for (int j=0;j<2*i;j++)
        {
            printf(" ");
        }
        for (int j=0;j<5-i;j++)
        {
            printf("* ");
        }
        printf("\n");
    }
    return 0;
}
```

---

---