Programming and Logic Building Tutorials

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1)Write a C program to perform and display the results of all arithmetic operations

(+, -, *, /, %) ontwo floating-point numbers provided by the user.

```
#include <stdio.h>
int main()
{
   int num1,num2,sum,sub,mul,mod,div;
   printf("enter two number:\n");
   scanf("%d%d",&num1,&num2);
   sum=num1+num2;
   printf("addition of two number=%d\n",sum);
   sub=num1-num2;
   printf("subtraction of two number=%d\n",sub);
   mul=num1*num2;
   printf("multiplication of two number=%d\n",mul);
   div=num1/num2;
   printf("division of two number=%d\n",div);
   return 0;
}
```

OUTPUT:

```
enter two number:
```

4

2

addition of two number=6

subtraction of two number=2

multiplication of two number=8

division of two number=2

2)Determine if a given year is a leap year or not using nested if-else statements.

```
#include <stdio.h>

int main()

 {

   int year;

   printf("Enter a year: ");

   scanf("%d", &year);

   if (year % 400 == 0) {

      printf("%d is a leap year.", year);

   }

      else if (year % 100 == 0) {

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

   }

      else if (year % 4 == 0) {

      printf("%d is a leap year.", year);

   }

   else {

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

```
  }

  return 0;

}
```

OUTPUT:

```
Enter a year: 2006

2006 is not a leap year
```

3)Print the first n prime numbers using a while loop and for loop.

```
#include <stdio.h>

int main()

{

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

  printf("\n Enter Any Number:");

  scanf("%d",&n);

  printf("\n Prime number between 1 to %d \n",n);

  while(i<=n)

  {

     j=0;

     int=1;

     while(j<=i)

     {

      if(i%j==0)

      {

       int++;

      }

     j++;
```

```
  }
    if(int==2)
    {
     printf(" %d",i);
    }
    i++;
 }
  return 0;
}
```

OUTPUT:

```
Enter Any Number
15
Prime number between 1 to 15
3  5  7  11  13
```

4)Calculate the GCD and LCM of two numbers using both iterative and recursive

functions.

```
#include <stdio.h>

 void main()

{

    int num1, num2, gcd, lcm, remainder, numerator, denominator;

    printf("Enter two numbers:\n");

    scanf("%d %d", &num1, &num2);

     numerator = (num1>num2)?num1:num2;

    denominator = (num1<num2)?num1:num2;

    remainder = numerator % denominator;


    while (remainder != 0)

    {

        numerator   = denominator;

        denominator = remainder;

        remainder   = numerator % denominator;

    }
```

```
    gcd = denominator;

    lcm = num1 * num2 / gcd;

    printf("GCD of %d and %d = %d\n", num1, num2, gcd);

    printf("LCM of %d and %d = %d\n", num1, num2, lcm);

}
```

OUTPUT:

```
Enter two numbers:

12 15

GCD of 12 and 15 = 3

LCM of 12 and 15 = 60
```

5)Dynamically allocate memory for an array of integers, accept values from the user,

and find thesum and average of the elements.

```
int main()
{
    int* ptr;
    int limit;
    int i;
    int sum;
    int average;
    printf("Enter limit of the array: ");
    scanf("%d", &limit);
    ptr = (int*)malloc(limit * sizeof(int));
    for (i = 0; i < limit; i++) {
        printf("Enter element %02d: ", i + 1);
        scanf("%d", (ptr + i));
    }
    printf("\nEntered array elements are:\n");
    for (i = 0; i < limit; i++) {
```

```
        printf("%d\n", *(ptr + i));
    }


        sum = 0;
    for (i = 0; i < limit; i++) {
        sum += *(ptr + i);
    }
    printf("Sum of array elements is: %d\n", sum);
}
for(i=0;i<limit;i++){
average=sum/total;
printf("average of array elements is:%d\n",average);
}
        free(ptr);
    return 0;
}
```

OUTPUT:

```
Enter limit of the array: 5
Enter element 01: 100
```

Enter element 02: 200

Enter element 03: 300

Enter element 04: 400

Enter element 05: 500

Entered array elements are:

100

200

300

400

500

Sum of array elements is: 1500

Average of array elements is: 1100

6)In array do the following:

1. Find given element in array

2. Find Max element

3. Find Min element

4. Find frequency of given element in array

Find Average of elements in Array.

```
#include<stdio.h>

void main()

{

  int a[5], i, j;

  printf("Enter elements of array\n");

  for(i=0;i<5;i++)

  {

    scanf("%d", &a[i]);

  }

  printf("Given elements of array are\n");

  for(j=0;j<5;j++)
```

```
  {
    printf("%d\n", a[j]);
  }
}
```

OUTPUT:

Enter elements of array

3

4

56

2

3

Given elements of array are

3

4

56

2

3

7)Write a C program that takes a string as input and performs the following operations:Reverse the string.

i) Check if the string is a palindrome.

ii) Count the frequency of each character in the string and display the results.

```
#include <stdio.h>

void isPalindrome(char *str)

 {

         int left = 0;

     int right = strlen(str) - 1;

   while (left < right) {

            if (str[left] != str[right]) {

          printf("\"%s\" is not palindrome.\n",

             str);

          return;

       }

       left++;

       right--;

   }
```

```
    printf("\"%s\" is palindrome.\n",
            str);
}

int main() {
    isPalindrome("madam");
    isPalindrome("hello");
    return 0;
}
int main() {
    char str[1000], ch;
    int count = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);

    printf("Enter a character to find its frequency: ");
    scanf("%c", &ch);
```

```
    for (int i = 0; str[i] != '\0'; ++i) {
        if (ch == str[i])
            ++count;
    }

    printf("Frequency of %c = %d", ch, count);
    return 0;
}
```

OUTPUT:

```
"madam" is palindrome.

"hello" is not palindrome

Enter a string: I love India

Enter a character to find its frequency: i

Frequency of e = 3
```

8)Display information of multiple students (name, age, grade) using an array of

structures

```
#include <stdio.h>

struct student {

    char firstName[50];

    int age;

    float marks;

} s[5];


int main() {

    int i;

    printf("Enter information of students:\n");

       for (i = 0; i < 5; ++i) {

        s[i].age = i + 1;

        printf("\nFor age%d,\n", s[i].roll);

        printf("Enter first name: ");

        scanf("%s", s[i].firstName);

        printf("Enter marks: ");
```

```
        scanf("%f", &s[i].marks);
    }
    printf("Displaying Information:\n\n");
    for (i = 0; i < 5; ++i) {
        printf("\nage: %d\n", i + 1);
        printf("First name: ");
        puts(s[i].firstName);
        printf("Marks: %.1f", s[i].marks);
        printf("\n");
    }
    return 0;
}
```

OUTPUT:

```
Enter name: Tom
Enter age:14
Enter marks: 91

Enter name: Jerry
Enter age:15
```

Enter marks: 89

.

.

.

Displaying Information:

Name: Tom

Age:14

Marks: 91

Name:Jerry

Age:15

Marks:89

9)Write a C program to store and retrieve employee records (name, id, salary) from a

binary file

```
#include<stdio.h>

typedef struct

{

 char name[30];

 int id;

 int salary;

}employee;


int main()

{

 int n,i,j;

 FILE *fptr;

 employee e[10], temp;

 fptr = fopen("employee.txt","rb");

 if(fptr == NULL)

 {
```

```
 printf("File error!");
 exit(1);
}
printf("Enter how many records:\n");
scanf("%d",&n);
for(i=0;i < n;i++)
{
 fread(&e[i],sizeof(e[i]),1, fptr);
}
for(i=0;i< n-1;i++)
{
 for(j=i+1;j< n;j++)
 {
  if(e[i].salary>e[j].salary)
  {
   temp = e[i];
   e[i] = e[j];
   e[j] = temp;
  }
```

```
 }
} for(i=0;i< n;i++)
{
  printf("Name = %s\tId = %d\tSalary = %d\n",e[i].name, e[i].id, e[i].salary);
}
 fclose(fptr);


 return 0;
}
```

OUTPUT:

```
Enter name:Ram Roy
Enter id:Ram1
Enter salary:40000
```

10)Create a program that uses a union to store an integer, a floating-point number, or

a string andDisplay the stored values.

```
#include <stdio.h>


// union template or declaration
union un {
    int member1;
    char member2;
    float member3;
};


// driver code
int main()
{
       union un var1;
    var1.member1 = 15;


    printf("The value stored in member1 = %d",
```

```
        var1.member1);


    return 0;

}
```

OUTPUT:

```
the value stored in member1 = 15
```