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SECTION: CSE-F

Design and Analysis Of Algorithms
CS23331

WEEK 1: BASIC C - PROGRAMMING PRACTICE

PROGRAM 1:

AIM: Given 2 numbers, write a program to swap them.

ALGORITHM:

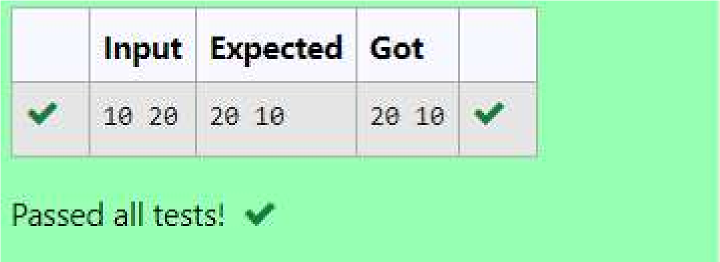
Step 1: Initialize a,b,temp as int
Step 2: Input numbers from user for a and b
Step 3: Perform temp=a, a=b, b=temp
Step 4: Display the number

PROGRAM:

```
#include<stdio.h>

int main()
{
    int a,b,temp;
    scanf("%d %d",&a,&b);
    temp=a;
    a=b;
    b=temp;
    printf("%d %d",a,b);
}
```

OUTPUT:



	Input	Expected	Got	
✓	10 20	20 10	20 10	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 2:

AIM: Write a program to find the eligibility of admission for a professional course based on the following criteria:
Marks in Math >= 65
Marks in Physics >= 55 [or] Total in all subjects >=180
Marks in Chemistry >= 50

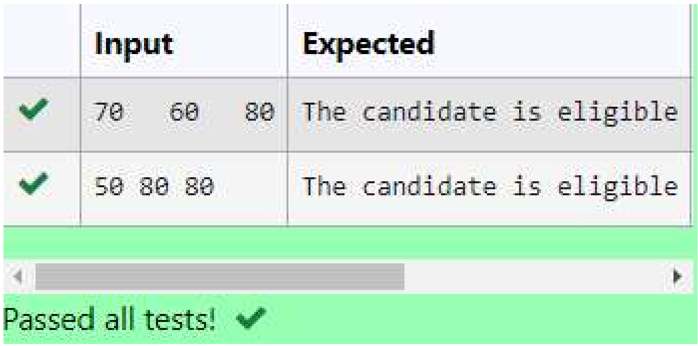
ALGORITHM:

```
Step 1: Initialize m as math, p as physics, c as chemistry all as int datatype.
Step 2: Input 3 numbers out of 100 from the user.
Step 3: Check if m>=65 and p>=55 and c>=50 →Then display “the candidate is eligible”
        Or check if m+p+c>=180 → Then display “the candidate is eligible”
        Else → Display “the candidate is not eligible”
```

PROGRAM:

```
 #include<stdio.h>
int main()
{
   int m,p,c;
   scanf("%d%d%d",&m,&p,&c);
   if (m>=65 && p>=55 && c>=50){
      printf("The candidate is eligible");
   }else if(m+p+c>=180){
      printf("The candidate is eligible");
   }else{
      printf("The candidate is not eligible");
   }}
```

OUTPUT:



	Input	Expected
✓	70 60 80	The candidate is eligible
✓	50 80 80	The candidate is eligible

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 3:

AIM: Malini goes to Best save hyper market to buy grocery items. Bestsave hypermarket provides 10% discount on the bill amount B whenever the bill amount B is more than Rs. 2000. The bill amount B is passed as the input to the program and it must print the final amount payable by Malini.

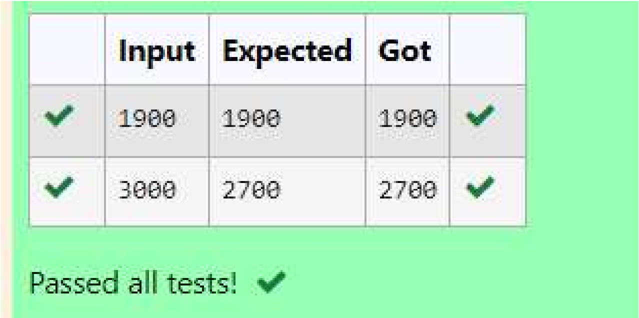
ALGORITHM:

Step 1: Initialize the payment and the discount as integer data types.
Step 2: Take an input for payment from the user.
Step 3: Check if payment > 2000, → calculate discount as payment*0.10 and subtract it from the original payment amount.
Display the new payment.
Step 4: Else → display the payment amount.

PROGRAM:

```
#include<stdio.h>
int main()
{
    int pay,disc;
    scanf("%d",&pay);
    if (pay>2000){
        disc=pay*0.10;
        pay=pay-disc;
        printf("%d",pay);
    }else{
        printf("%d",pay);
    }
}
```

OUTPUT:



	Input	Expected	Got	
✓	1900	1900	1900	✓
✓	3000	2700	2700	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 4:

AIM: Baba is very kind to beggars and every day Baba donates half of the amount he has whenever a beggar requests him. The money m left in Baba’s hand is passed as the input and the number of beggars B who received the alms are passed as the input. The program must print the money Baba had at the beginning of the day.

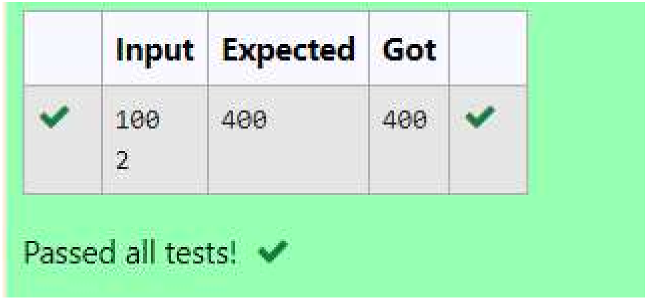
ALGORITHM:

```
Step 1: Initialize m and n as integer data types symbolizing the money and the number of beggars.
Step 2: Take an input from the user for the number of beggars and the money amount.
Step 3: Initialize the for loop until n, and multiply the money as money=money * n
Step 4: Outside the loop display the amount m symbolizing the money in hand.
```

PROGRAM:

```
#include<stdio.h>
int main()
{
    int m,n;
    scanf("%d%d",&m,&n);
    for (int i=0;i<n;i++)
    {
        m=m*n;
    }
    printf("%d",m);
}
```

OUTPUT:



	Input	Expected	Got	
✓	100 2	400	400	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 5:

AIM: The CEO of company ABC inc wanted to encourage the employees coming on time to the office so he announced that for every consecutive day an employee comes on time [starting from Monday through Saturday] he will be awarded Rs. 200 more than the previous day as “Punctuality incentive”. Incentive for starting day is passed as input and the number of days N is also passed. The program is to calculate the “Punctuality incentive” P of the employee.

ALGORITHM:

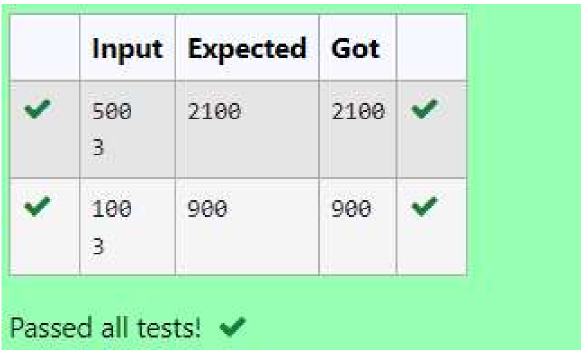
Step 1: Initialize incentive i, n number of days and sum as integer datatype
Step 2: Take an input from the user for incentive and number of days i and n.
Step 3: initialize the sum as i, and initiate a for loop till n-1;
Within this for loop, calculate incentive as incentive + 200 and the sum + incentive.
Step 4: Outside the loop, display the sum.

PROGRAM:

```
#include<stdio.h>

int main()
{
    int i,n,sum;
    scanf("%d%d",&i,&n);
    sum=i;
    for (int j=1;j<n;j++){
        i=i+200;
        sum+=i;
    }printf("%d",sum);
}
```

OUTPUT:



	Input	Expected	Got	
✓	500 3	2100	2100	✓
✓	100 3	900	900	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 6:

AIM: Two numbers a and b are passed as the input. A number x is also passed as the input. The program must print the numbers divisible by x from b to a range inclusive of a and b.

ALGORITHM:

Step 1: Initialize the numbers as a, b, c as integer data types.

Step 2: Take an input for a, b and c from the user.

Step 3: In a for loop, >=a, decrementing the value,

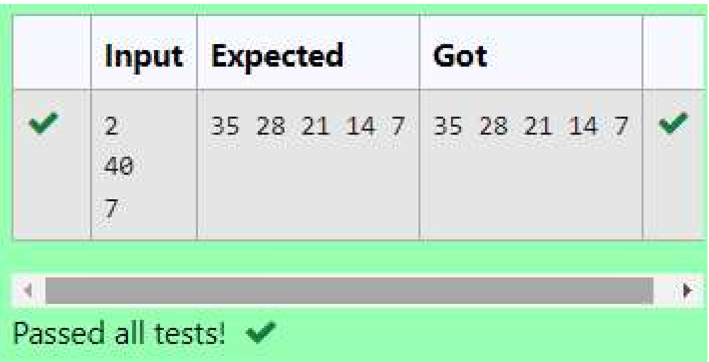
Check if i%c==0, → Display the number i

Else → continue

PROGRAM:

```
#include<stdio.h>
int main()
{
    int a,b,c;
    scanf("%d%d%d",&a,&b,&c);
    for (int i=b;i>=a;i--)
    {
        if(i%c==0)
        {
            printf("%d ",i);
        }
        else
        continue;
    }
}
```

OUTPUT:



	Input	Expected	Got	
✓	2 40 7	35 28 21 14 7	35 28 21 14 7	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 7:

AIM: Write a program to find the quotient and remainder of the given integers.

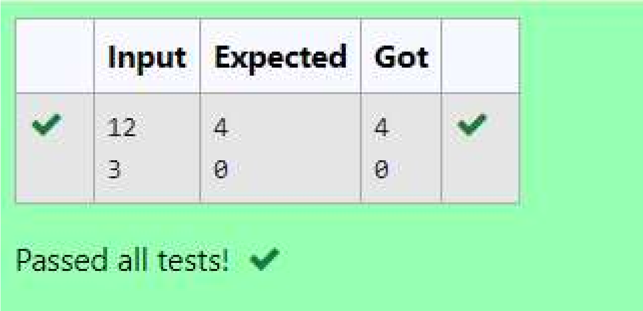
ALGORITHM:

Step 1: Initialize the 2 numbers a and b.
Step 2: Take an input for a and b from the user.
Step 3: Display a/b and a%b.

PROGRAM:

```
#include<stdio.h>
int main()
{
    int a,b;
    scanf("%d%d",&a,&b);
    printf("%d\n",a/b);
    printf("%d",a%b);
}
```

OUTPUT:



	Input	Expected	Got	
✓	12 3	4 0	4 0	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 8:

AIM: Write a program to find the biggest number out of the 3 given integers.

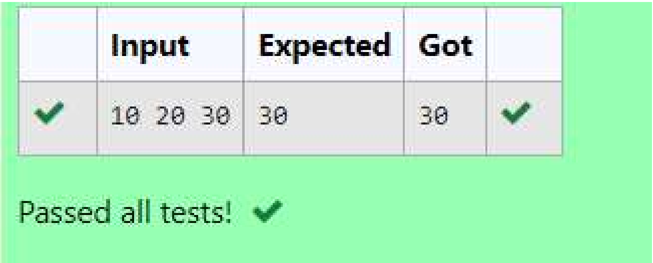
ALGORITHM:

```
Step 1: Initialize the 3 numbers as a, b, c as integer data types.
Step 2: Take an input from the a, b, c.
Step 3: Check if a>b  and a>c → Display a
           Else check if b>a and b>c → Display b
           Else check if c>a and c>b → Display c
```

PROGRAM:

```
#include<stdio.h>
int main()
{
   int a,b,c;
   scanf("%d%d%d",&a,&b,&c);
   if (a>b && a>c)
      printf("%d",a);
   else if (b>a && b>c)
      printf("%d",b);
   else if (c>a && c>b)
      printf("%d",c);
}
```

OUTPUT:



	Input	Expected	Got	
✓	10 20 30	30	30	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 9:

AIM: Write a C program to find whether the given number is odd or even.

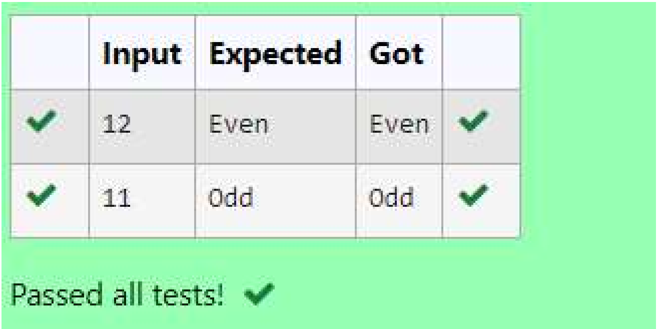
ALGORITHM:

```
Step 1: Initialize a number M as integer data type.
Step 2: Take an input from the user.
Step 3: Check if m%2==0 → Display even
          Else → Display odd.
```

PROGRAM:

```
#include<stdio.h>
int main()
{
   int m;
   scanf("%d",&m);
   if (m%2==0)
   printf("Even");
   else
   printf("Odd");
}
```

OUTPUT:



	Input	Expected	Got	
✓	12	Even	Even	✓
✓	11	Odd	Odd	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 10:

AIM: Write a C program to find the factorial of a number N.

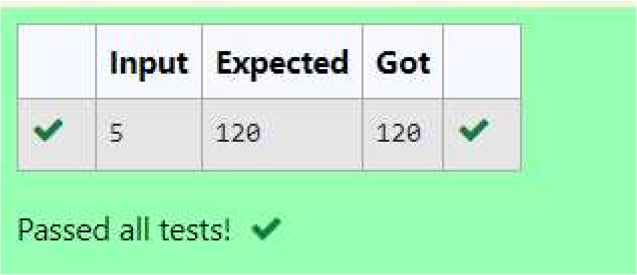
ALGORITHM:

```
Step 1: Initialize x , i and factorial=1 as integer data type.
Step 2: Take an input for x.
Step 3: In a for loop, as i=1, and i<=x
            Calculate fact*=i
Step 4: Display the factorial.
```

PROGRAM:

```
#include<stdio.h>
int main()
{
    int x,i,fact=1;
    scanf("%d",&x);
    for (i=1;i<=x;i++)
        fact*=i;
    printf("%d",fact);
}
```

OUTPUT:



	Input	Expected	Got	
✓	5	120	120	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 11:

AIM: Write a C program to find the sum of first N natural.

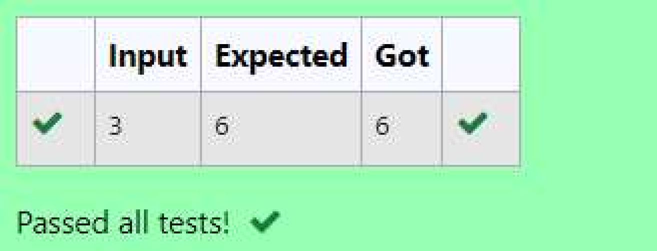
ALGORITHM:

Step 1: Initialize x and sum=0 as integer data type.
Step 2: Take an input for x from the user.
Step 3: In a for loop, i=1, i<=x, Calculate sum+=i
Step 4: Display sum.

PROGRAM:

```
#include<stdio.h>
int main()
{
    int x,sum=0;
    scanf("%d",&x);
    for (int i=1;i<=x;i++)
    {
        sum+=i;
    }
    printf("%d",sum);
}
```

OUTPUT:



	Input	Expected	Got	
✓	3	6	6	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 12:

AIM: Write a C program to find the Nth term in the fibonacci series.

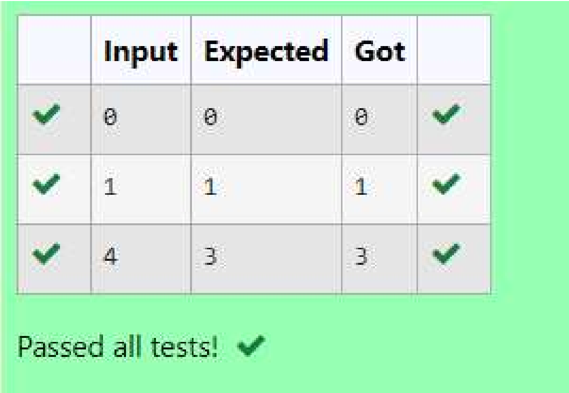
ALGORITHM:

```
Step 1: Initialize n, f0=0, f1=1, f2 and z=0, o=1 as integer data type.
Step 2: Take an input for n.
Step 3: Check if n==0, → Display z
          Else if n==1 → Display 0
          Else calculate f2=f1+f0, f0=f1 and f1=f2 within a for loop
Step 4: Display f2.
```

PROGRAM:

```
#include<stdio.h>
int main()
{
   int n,f0=0,f1=1,f2,z=0,o=1;
   scanf("%d",&n);
   if(n==0) printf("%d",z);
   else if(n==1) printf("%d",o);
   else{
      for(int i=1;i<n;i++){
         f2=f1+f0;
         f0=f1;
         f1=f2;
      }printf("%d",f2);
   }}
```

OUTPUT:



	Input	Expected	Got	
✓	0	0	0	✓
✓	1	1	1	✓
✓	4	3	3	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 13:

AIM: Write a C program to find the powers of integers.

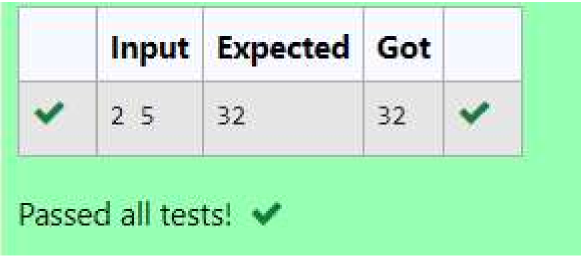
ALGORITHM:

Step 1: Initialize y, x and p as integers.
Step 2: Take an input from the user for x and y.
Step 3: calculate p as p=pow(x,y) and display p.

PROGRAM:

```
#include<stdio.h>
#include<math.h>
int main()
{
   int y,x,p;
   scanf("%d%d",&x,&y);
   p=pow(x,y);
   printf("%d",p);
}
```

OUTPUT:



	Input	Expected	Got	
✓	2 5	32	32	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 14:

AIM: Write a C program to find whether the integer is prime or not.

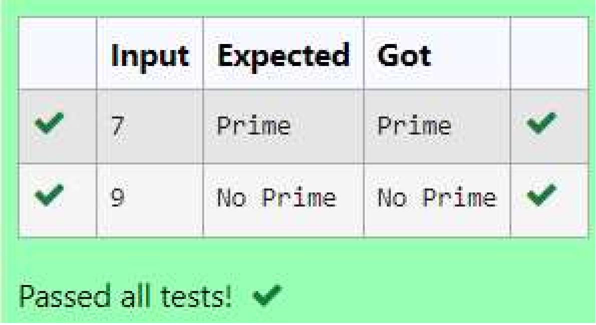
ALGORITHM:

```
Step 1: Initialize m as integer.
Step 2: Take an input for m.
Step 3: Check if m%2!=0 and m%3!=0 and m%5!=0 → Display prime
          Else → display not prime.
```

PROGRAM:

```
#include<stdio.h>
int main()
{
   int m;
   scanf("%d",&m);
   if (m%2!=0 && m%3!=0 && m%5!=0)
   {
      printf("Prime");
   }
   else
   {
      printf("No Prime");
   }
}
```

OUTPUT:



	Input	Expected	Got	
✓	7	Prime	Prime	✓
✓	9	No Prime	No Prime	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.

PROGRAM 15:

AIM: Write a C program to find reverse of integer

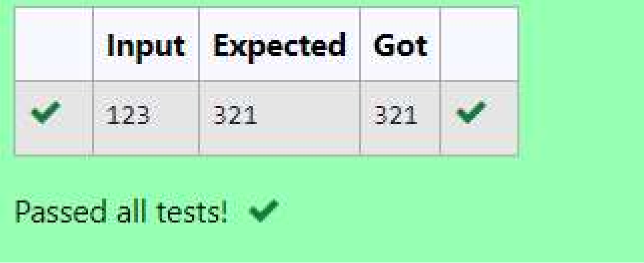
ALGORITHM:

```
Step 1: Initialize m, rev=0 and rem as integers.
Step 2: Take an input for m
Step 3: While m!=0 → rem=n%10 rev=rev*10+rem and m/=10
Step 4: Display rev
```

PROGRAM:

```
#include<stdio.h>
int main()
{
    int m,rev=0,rem;
    scanf("%d",&m);
    while(m!=0)
    {
        rem=m%10;
        rev=rev*10+rem;
        m/=10;
    }
    printf("%d",rev);
}
```

OUTPUT:



	Input	Expected	Got	
✓	123	321	321	✓

Passed all tests! ✓

RESULT: Thus, the program is executed successfully.