RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105

RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

CS23331 - Design and Analysis of Algorithms

Laboratory Record Notebook

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Branch : B.E COMPUTER SCIENCE AND ENGINEERING

Year : II

Section : A

Semester : III

Academic Year: 2024-25

NAME : GANESHAN M

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DEPT : B E COMPUTER SCIENCE AND ENGINEERING - A

Week-1 Basic C Programming

QUESTION

AIM :

Given two numbers, write a C program to swap the given numbers.

For example:

Input	Result
10 20	20 10

ALGORITHM :

Step 1: Start

Step 2: Input integers x and y

Step 3: Store the value of x in

temp Step 4: Assign the value

of y to x Step 5: Assign the

value of temp to y Step 6: Print

x and y

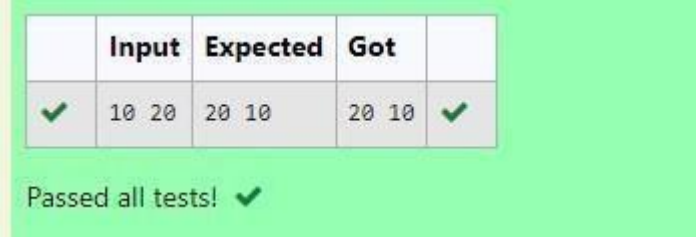
Step 7: Stop

PROGRAM :

```
#include<stdio.h>
int main ()
{
    int a,b,temp;
    scanf("%d",&a);
    scanf("%d",&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 :

The above program is executed successfully.

AIM:

Write a C program to find the eligibility of admission for a professional course based on the following criteria:

Marks in Maths >= 65
Marks in Physics >= 55
Marks in Chemistry >= 50
Or
Total in all three subjects >= 180

Sample Test Cases

Test Case 1

Input

70 60 80

Output

The candidate is eligible

Test Case 2

Input

50 80 80

Output

The candidate is eligible

Test Case 3

Input

50 60 40

Output

The candidate is not eligible

ALGORITHM:

Step 1: Start

Step 2: Input marks for Physics (p), Chemistry (c), and Math (m)

Step 3: Check if m >= 65, p >= 55, c >= 50 or if the total marks m + p + c >= 180

Step 4: If true, print "The candidate is eligible"; else, print "The candidate is not eligible" Step 5: Stop

PROGRAM :

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

}
```

OUTPUT:

	Input	Expected	Got	
✔	70 60 80	The candidate is eligible	The candidate is eligible	✔
✔	50 80 80	The candidate is eligible	The candidate is eligible	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Malini goes to BestSave hyper market to buy grocery items. BestSave hyper market provides 10% discount on the bill amount B when ever the bill amount B is more than Rs.2000.

The bill amount B is passed as the input to the program. The program must print the final amount A payable by Malini.

Input Format:

The first line denotes the value of B.

Output Format:

The first line contains the value of the final payable amount A.

Example Input/Output 1:

Input:

1900

Output:

1900

Example Input/Output 2:

Input:

3000

Output:

2700

ALGORITHM:

Step 1: Start

Step 2: Input the bill amount b

Step 3: If b > 2000, calculate a discount of 10% and subtract it from b to get the final amount f Step 4: If b <= 2000, set f = b

Step 5: Print f

Step 6: Stop

PROGRAM:

```c
#include<stdio.h>
int main()
{
    int b;
    scanf("%d",&b);
    if(b>2000)
    {
        int p=(0.1*b);
        int pay=(b-p);
        printf("%d",pay);
    }
    else{
        printf("%d",b);
    }
}
```

OUTPUT:

	Input	Expected	Got	
✔	1900	1900	1900	✔
✔	3000	2700	2700	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Baba is very kind to beggars and every day Baba donates half of the amount he has when ever 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 in the beginning of the day.

Input Format:

The first line denotes the value of M.
The second line denotes the value of B.

Output Format:

The first line denotes the value of money with Baba in the beginning of the day.

Example Input/Output:

Input:

100
2

Output:

400

Explanation:

Baba donated to two beggars. So when he encountered second beggar he had 100*2 = Rs.200 and when he encountered 1st he had 200*2 = Rs.400.

ALGORITHM:

Step 1: Start

Step 2: Input integers m and b

Step 3: While b is not zero, double the value of m and decrement b by 1 Step

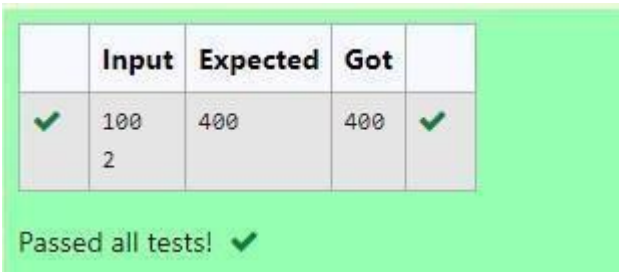
4: Print the value of m

Step 5: Stop

PROGRAM:

```
#include<stdio.h>
int main(){
    int m,b;
    scanf("%d %d",&m,&b);
    int i=0;
    while(i<b){
        m=m*2;
        i++;
    }
    printf("%d",m);
}
```

OUTPUT:



	Input	Expected	Got	
✔	100 2	400	400	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

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 in a week (starting from Monday to Saturday), he will be awarded Rs.200 more than the previous day as "Punctuality Incentive". The incentive I for the starting day (ie on Monday) is passed as the input to the program. The number of days N an employee came on time consecutively starting from Monday is also passed as the input. The program must calculate and print the "Punctuality Incentive" P of the employee.

Input Format:

The first line denotes the value of I.
The second line denotes the value of N.

Output Format:

The first line denotes the value of P.

Example Input/Output:

Input:

500
3

Output:

2100

Explanation:

On Monday the employee receives Rs.500, on Tuesday Rs.700, on Wednesday Rs.900

So total = Rs.2100

ALGORITHM:

Step 1: Start

Step 2: Input integers i and d Step 3:

Initialize s with the value of i

Step 4: While d > 1, add 200 to i, add i to s, and decrement d by 1

Step 5: Print the value of s

Step 6: Stop

PROGRAM:

```
#include<stdio.h>
int main(){
    int i,n,a=0,t=0;
    scanf("%d %d",&i,&n);
    while(a<n){
        t=t+i;
        i=i+200;
        a++;
    }
    printf("%d",t);
}
```

OUTPUT:

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

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Two numbers M and N are passed as the input. A number X is also passed as the input. The program must print the numbers divisible by X from N to M (inclusive of M and N).

Input Format:

The first line denotes the value of M
The second line denotes the value of N
The third line denotes the value of X

Output Format:

Numbers divisible by X from N to M, with each number separated by a space.

Boundary Conditions:

1 <= M <= 9999999
M < N <= 9999999
1 <= X <= 9999

Example Input/Output 1:

Input:
2
40
7

Output:
35 28 21 14 7

Example Input/Output 2:

Input:
66
121
11

Output:
121 110 99 88 77 66

ALGORITHM:

Step 1: Start

Step 2: Input integers m, n, and x Step

3: Initialize i with the value of n

Step 4: While i >= m, if i is divisible by x, print i

Step 5: Decrement i by 1

Step 6: Stop

PROGRAM:

```
#include<stdio.h>
int main()
{
    int n,m,x;
    scanf("%d %d %d",&n,&m,&x);
    while(m>=n){
        if (m%x==0){
            printf("%d ", m);
        }
        m--;
    }
}
```

OUTPUT:

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

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find the quotient and reminder of given integers.

For example:

Input	Result
12 3	4 0

ALGORITHM:

Step 1: Start

Step 2: Input integers a and d

Step 3: Calculate the quotient q = a / d and remainder r = a % d

Step 4: Print q and r

Step 5: Stop

PROGRAM:

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

OUTPUT:

	Input	Expected	Got	
✔	12 3	4 0	4 0	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find the biggest among the given 3 integers?

For example:

Input	Result
10 20 30	30

ALGORITHM:

Step 1: Start

Step 2: Input three integers a, b, and c

Step 3: Check which of the three integers is the largest

Step 4: Print the largest integer

Step 5: Stop

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{
        printf("%d",c);
    }
}
```

OUTPUT:

	Input	Expected	Got	
✔	10 20 30	30	30	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find whether the given integer is odd or even?

For example:

Input	Result
12	Even
11	Odd

ALGORITHM:

Step 1: Start

Step 2: Input an integer a

Step 3: Check if a is even or odd

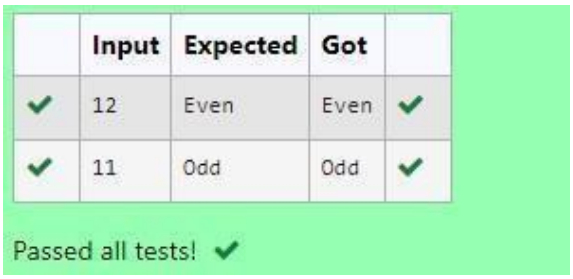
Step 4: Print "Even" if a is even; otherwise, print "Odd"

Step 5: Stop

PROGRAM:

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

OUTPUT:



	Input	Expected	Got	
✔	12	Even	Even	✔
✔	11	Odd	Odd	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find the factorial of given n.

For example:

Input	Result
5	120

ALGORITHM:

Step 1: Start

Step 2: Input an integer a

Step 3: Set x = a

Step 4: While x > 1, decrement x by 1 and multiply it with a

Step 5: Print the final value of a

Step 6: Stop

PROGRAM:

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

OUTPUT:

	Input	Expected	Got	
✔	5	120	120	✔

Passed all tests! ✔

RESULT:

The **above** program is executed successfully.

AIM:

Write a C program to find the sum first N natural numbers.

For example:

Input	Result
3	6

ALGORITHM:

Step 1: Start

Step 2: Input an integer a

Step 3: Initialize b = 0

Step 4: While a != 0, add a to b and decrement a by 1

Step 5: Print the value of b

Step 6: Stop

PROGRAM:

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

:

OUTPUT:

	Input	Expected	Got	
✔	3	6	6	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

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

For example:

Input	Result
0	0
1	1

ALGORITHM:

Step 1: Start

Step 2: Input an integer n

Step 3: Define a recursive function fib(n) that returns fib(n-1) + fib(n-2) for n > 1 and n for n <= 1

Step 4: Print the result of fib(n)

Step 5: Stop

PROGRAM:

```
#include<stdio.h>
int fib(int n)
{
    if(n<=1){
        return n;
    }
    else{
        return fib(n-1)+fib(n-2);
    }
}
int main()
{
    int n;
    scanf("%d",&n);
    printf("%d",fib(n));
    return 0;
}
```

OUTPUT:

	Input	Expected	Got	
✔	0	0	0	✔
✔	1	1	1	✔
✔	4	3	3	✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find the power of integers.

input:

a b

output:

a^b value

ALGORITHM:

Step 1: Start

Step 2: Input integers a and b

Step 3: Initialize i = 0 and p = 1

Step 4: While i < b, multiply p with a and increment i by 1

Step 5: Print the value of p

Step 6: Stop

PROGRAM:

```
#include<stdio.h>
int main()
{
    int a,b;
    scanf("%d %d",&a,&b);
    int i=0;
    int p=1;
    while(i<b){
        p=p*a;
        i++;
    }
    printf("%d",p);
}
```

OUTPUT:

	Input	Expected	Got	
✔	2 5	32	32	✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find Whether the given integer is prime or not.

For example:

Input	Result
7	Prime
9	No Prime

ALGORITHM:

Step 1: Start

Step 2: Input an integer n

Step 3: For each number i from 2 to n-1, check if n % i == 0 Step 4: If

divisible, set flag = 1 and break; else, set flag = 0

Step 5: If flag == 0, print "Prime"; else, print "No Prime"

Step 6: Stop

PROGRAM:

```c
#include<stdio.h>
int main()
{
    int n,flag;
    scanf("%d",&n);


    for(int i=2;i<n;i++){
        if(n%i==0){
            flag=1;
            break;
        }
        else{
            flag=0;
        }
    }
    if(flag==0){
        printf("Prime");
    }
    else{
        printf("No Prime");
    }
}
```

OUTPUT:

	Input	Expected	Got	
✔	7	Prime	Prime	✔
✔	9	No Prime	No Prime	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.

AIM:

Write a C program to find the reverse of the given integer?

ALGORITHM:

Step 1: Start

Step 2: Input an integer n

Step 3: Initialize rev = 0

Step 4: While n != 0, calculate the remainder rem = n % 10

Step 5: Update rev = rev * 10 + rem and divide n by 10

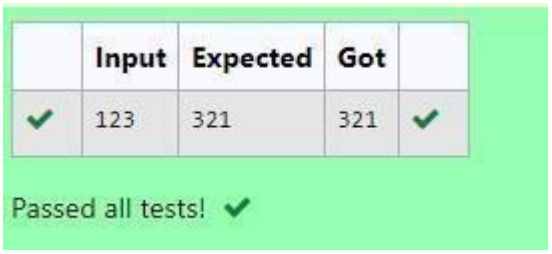
Step 6: Print rev

Step 7: Stop

PROGRAM:

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

OUTPUT:



	Input	Expected	Got	
✔	123	321	321	✔

Passed all tests! ✔

RESULT:

The above program is executed successfully.