RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105



CS23331 - Design and Analysis of Algorithms

Laboratory Record Notebook

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Branch: B.E COMPUTER SCIENCE

AND ENGINEERING

Year: II

Section: D

Semester: III

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DEPT: BE COMPUTER SCIENCE AND ENGINEERING - D

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

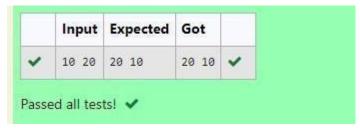
value of temp to y Step 6: Print

x and y

Step 7: Stop

```
#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:



RESULT:

```
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
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

```
#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	~

RESULT:

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

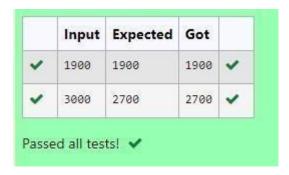
Step 3: If b > 2000, calculate a discount of 10% and subtract it from b to get the final amount f Step 4:

If b <= 2000, set f = b

Step 5: Print f Step 6: Stop

```
#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:



RESULT:

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

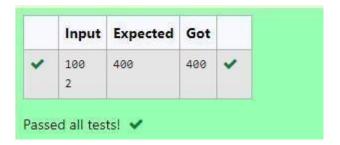
Step 2: Input integers m and b

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

```
#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);
}</pre>
```



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);
}</pre>
```

OUTPUT:

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

RESULT:

```
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:
  40
  Output: 35 28 21 14 7
  Example Input/Output 2:
  Input:
  121
 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

```
#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--;
```

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	4
3	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

```
#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:

1	12	4	4	~
	3	0	0	

RESULT:

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

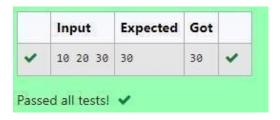
Step 2: Input three integers a, b, and c

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

Step 4: Print the largest integer

Step 5: Stop

```
#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);
    }
}
```



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

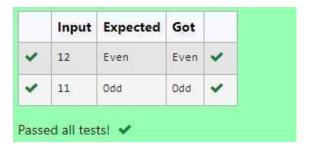
Step 2: Input an integer a

Step 3: Check if a is even or odd

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

Step 5: Stop

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



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 = aStep 4: While x > 1, decrement x by 1 and multiply it with a Step 5: Print the final value of a Step 6: Stop

```
#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);
}</pre>
```

OUTPUT:

	Input	Expected	Got	
~	5	120	120	~

RESULT:

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);
}</pre>
```

:

OUTPUT:



RESULT:

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;
}</pre>
```

OUTPUT:

	Input	Expected	Got	
~	0	0	0	~
~	1	1	1	~
~	4	3	3	~

RESULT:

```
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);
}</pre>
```

OUTPUT:

	Input	Expected	Got	
~	2 5	32	32	~

RESULT:

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"

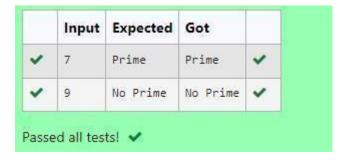
Step 6: Stop

PROGRAM:

OUTPUT:

```
#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");
    }
}</pre>
```



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

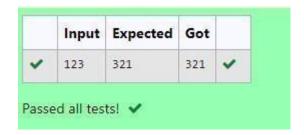
Step 4: While n != 0, calculate the remainder rem = n % 10

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

Step 6: Print rev

Step 7: Stop

```
#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);
}
```



RESULT: