
eLab1.0

Mathslab Sessions

1. *Basic Operations*
2. *M-Files*
3. *Operations on Operators*
4. *Decisions*
5. *Control Structures*
6. *Strings*
7. *Functions*
8. *Data Visualization*
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SRM University Learning Centre

1st Edition

Q. Basic array vector Operations

Create a simple vector with 9 elements called a with elements 1,2,3,4,6,4,3,4,5. Add 2 to each element of our vector, a, and store the result in a new vector. Display the values of a and b

Source Code

```
a = [1 2 3 4 6 4 3 4 5]  
b = a + 2
```

Sample Input

0

Sample Output

a =

1 2 3 4 6 4 3 4 5

b =

3 4 5 6 8 6 5 6 7

Result

Thus, Program "**Basic array vector Operations**" has been successfully executed

Q. Vector Add and Multiplication

Create a simple vector with 7 elements called c with elements 1,2,3,4,6,4,3,4,5. Multiply 2 and then add 7 to each element of our vector, c, and store the result in a new vector.

Source Code

```
c = [1 2 3 4 6 4 3 4 5];  
d = c*2 + 7;  
c  
d
```

Sample Input

0

Sample Output

```
c =  
1 2 3 4 6 4 3 4 5  
d =  
9 11 13 15 19 15 13 15 17
```

Result

Thus, Program " **Vector Add and Multiplication** " has been successfully executed

Q. Basic array vector Operations

Create a simple column vector with 4 elements such as 5, 2, 7, 5 called a. Add 3 to each element of our vector, a, and store the result in a new vector

Source Code

```
a=[5;2;7;5]  
b=a+3
```

Sample Input

0

Sample Output

a =

5
2
7
5

b =

8
5
10
8

Result

Thus, Program "**Basic array vector Operations**" has been successfully executed

Q. DISP vector

Create a simple column vector with 4 elements (10,5,4,8) called a. subtract 3 to each element of our vector, a, and store the result in a new vector and display the values using Display function

Source Code

```
a=[10;5;4;8];  
b=a-3;  
disp(a);  
disp(b);
```

Sample Input

0

Sample Output

```
10  
5  
4  
8  
7  
2  
1  
5
```

Result

Thus, Program "**DISP vector**" has been successfully executed

Q. DOT operations

Create an array from 1 to 10 having 5 elements in equal space and perform .*, ./, .^, .\ operations with the value 2. For eg. x.*2. Hint: use linspace function

Source Code

```
x=linspace(1,10,5);
x1=x.*2;
x2=x./2;
x3=x.^2;
x4=x.\2;
disp(x);
disp(x1);
disp(x2);
disp(x3);
disp(x4);
```

Sample Input

0

Sample Output

```
1.0000 3.2500 5.5000 7.7500 10.0000
2.0000 6.5000 11.0000 15.5000 20.0000
0.50000 1.62500 2.75000 3.87500 5.00000
1.0000 10.5625 30.2500 60.0625 100.0000
2.00000 0.61538 0.36364 0.25806 0.20000
```

Result

Thus, Program "**DOT operations**" has been successfully executed

Q. Basic Matrix Operations

Create 3*3 matrix i) With all zeros ii) With all ones iii) Identity matrix

Source Code

```
a=zeros(3,3); b=ones(3,3); c=eye(3,3);  
a  
b  
c
```

Sample Input

0

Sample Output

a =

```
0 0 0  
0 0 0  
0 0 0
```

b =

```
1 1 1  
1 1 1  
1 1 1
```

c =

Diagonal Matrix

```
1 0 0  
0 1 0  
0 0 1
```

Result

Thus, Program "**Basic Matrix Operations**" has been successfully executed

Q. Basic Matrix Operations

Create a 4-by-4 array of ones using ones() function and name it as x Create a 4-by-3 array of ones using ones() function and name it as y

Source Code

```
x=ones(4)  
y=ones(4,3)
```

Sample Input

0

Sample Output

x =

```
1 1 1 1  
1 1 1 1  
1 1 1 1  
1 1 1 1
```

y =

```
1 1 1  
1 1 1  
1 1 1  
1 1 1
```

Result

Thus, Program "**Basic Matrix Operations**" has been successfully executed

Q. Basic Matrix Operations

Create a 4-by-4 array of ones using ones() function and name it as x and perform x+4 function

Source Code

```
x=ones(4)  
y=x+4
```

Sample Input

0

Sample Output

x =

```
1 1 1 1  
1 1 1 1  
1 1 1 1  
1 1 1 1
```

y =

```
5 5 5 5  
5 5 5 5  
5 5 5 5  
5 5 5 5
```

Result

Thus, Program "**Basic Matrix Operations**" has been successfully executed

Q. Basic array vector Operations

Get a 3*3 matrix given as an input assign it to a. b returns the largest element in a vector. c returns the smallest element in a vector. d returns the sum of elements in a vector e returns the product of all elements in a vector.

Source Code

```
a=[1 2 3; 4 5 6; 7 8 9]
b=max(a)
c=min(a)
d=sum(a)
e=prod(a)
```

Sample Input

0

Sample Output

```
a =
1 2 3
4 5 6
7 8 9
```

```
b =
7 8 9
```

```
c =
1 2 3
```

```
d =
12 15 18
```

```
e =
28 80 162
```

Result

Thus, Program "**Basic array vector Operations**" has been successfully executed

Q. Basic array vector Operations

Take two inputs from the user as a and b and check the relationship between the two variables. 1. Depends on both the values using (AND operation) it should return "Both are non-zero or not". 2.Depends on both the values using (OR operation) it should return "Atleast one of the value is non-zero or not". 3. Depends on both the values using (NOT operation) it should return "Both values are non-zero and its negation is zero or not".

Source Code

```
a=input("");
b=input("");
if a&&b
    disp('Both are non-zero');
else
    disp('One of the value is 0');
end
if a||b
    disp('Atleast one of the value is non-zero');
else
    disp('Both values are zero');
end
if (~(a&&b))
    disp('Both values are zero and its negation is non-zero');
else
    disp('Both values are non-zero and its negation is zero');
end
```

Sample Input

5
6

Sample Output

Both are non-zero
Atleast one of the value is non-zero
Both values are non-zero and its negation is zero

Result

Thus, Program "**Basic array vector Operations**" has been successfully executed

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Q. Linda

Linda and Dan order pasta for Rs.317.00, salad for Rs.333.00, and 2 glasses of lemonade for Rs.34.00 each. The tax is Rs.57.50. How much change should they get from Rs.780.00?

Source Code

```
p=317.00; s=333.00; l=34.00; tax=57.50; paid=780.00;  
bill=p+s+(2*l)+tax;  
balance=paid-bill
```

Sample Input

0

Sample Output

balance = 4.5000

Result

Thus, Program "**Linda**" has been successfully executed

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Q. Khan and Dubey

Khan and Dubey order pasta for Rs.317.00, salad for Rs.333.00, and 2 glasses of lemonade for Rs.34.00 each. The tax is Rs.57.50. How much change should they get from Rs.1000?

Source Code

```
p=317.00; s=333.00; l=34.00; tax=57.50; paid=1000.00;  
bill=p+s+(2*l)+tax;  
balance=paid-bill
```

Sample Input

0

Sample Output

balance = 224.50

Result

Thus, Program "**Khan and Dubey**" has been successfully executed

Q. Robert

Robert deposits Rs. 3000 in State Bank of India for 3 year which earn him an interest of 8%. What is the amount he gets after 1 year, 2 years and 3 years?

Source Code

```
p=3000;n=1;r=0.08; i=p*n*r; A1=p+i;  
p=3000;n=2;r=0.08; i=p*n*r; A2=p+i;  
p=3000;n=3;r=0.08; i=p*n*r; A3=p+i;  
fprintf('Amount he gets after 1 year =%0.2f',A1);  
fprintf('\nAmount he gets after 1 year =%0.2f',A2);  
fprintf('\nAmount he gets after 1 year =%0.2f',A3);
```

Sample Input

0

Sample Output

```
Amount he gets after 1 year =3240.00  
Amount he gets after 1 year =3480.00  
Amount he gets after 1 year =3720.00
```

Result

Thus, Program "**Robert**" has been successfully executed

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Q. Bitwise Operations

Get two vector array with binary values from the user Perform Bit-OR and return to a Perform Bit-OR and return to b

Source Code

```
u=input();  
v=input();  
x=u|v;  
y=u&v;  
disp(x);  
disp(y);
```

Sample Input

```
[1 1 1 0 0 1]  
[1 0 0 1 0 1]
```

Sample Output

```
1 1 1 1 0 1  
1 0 0 0 0 1
```

Result

Thus, Program "**Bitwise Operations**" has been successfully executed

Q. Matrix Operations

Create a 3*3 matrix and assign it to y with values with 1 2 3 4 5 6 7 8 9 a returns the determinant of the matrix b returns the rank of the matrix c returns the sum of all diagonal elements of the matrix d returns the size of the matrix

Source Code

```
y=[1 2 3; 4 5 6; 7 8 9]
a=det(y)
b=rank(y)
c=trace(y)
d=size(y)
```

Sample Input

0

Sample Output

y =

```
1 2 3
4 5 6
7 8 9
```

```
a = 6.6613e-16
b = 2
c = 15
d =
```

3 3

Result

Thus, Program "**Matrix Operations**" has been successfully executed

Q. Integer Input

Write a Matlab program that asks the user to enter an integer and to print its value

Source Code

```
a=input("");
fprintf("Entered Value:%d",a);
```

Sample Input

87

Sample Output

Entered Value:87

Result

Thus, Program " Integer Input " has been successfully executed

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Q. Float input

Write a Matlab program that asks the user to enter a float and to print its value. Print the floating point value correct to 2 decimal places

Source Code

```
a=input("");
fprintf("Entered Value:%0.2f ",a);
```

Sample Input

5.6734

Sample Output

Entered Value:5.67

Result

Thus, Program "**Float input**" has been successfully executed

Q. String input

Write a Matlab program that asks the user to enter a string and to print its value.

Source Code

```
a=input("", "s");
fprintf("Entered String:%s ",a);
```

Sample Input

Hai

Sample Output

Entered String:Hai

Result

Thus, Program "**String input**" has been successfully executed

Q. Tab space and sum in new line

Write a Matlab program that asks the user to enter two integers and print them separated by a tab space and also print the sum of the values in the new line.

Source Code

```
a=input("");
b=input("");
fprintf("Entered Values:%d %d",a,b);
c=a+b;
fprintf("\nSum:%d ",c);
```

Sample Input

45
54

Sample Output

Entered Values:45 54
Sum:99

Result

Thus, Program "**Tab space and sum in new line**" has been successfully executed

Q. Profit percentage Calculator

SRM University buys an old scooter for Rs.A and spends Rs.B on its repairs. If he sells the scooter for Rs.C. What is his gain %?

Source Code

```
a=input("");
b=input("");
sp=input("");
cp=a+b;
g=(sp-cp)/cp*100;
fprintf("Gain percentage=%0.2f ", g);
```

Sample Input

4700
800
5800

Sample Output

Gain percentage=5.45

Result

Thus, Program " **Profit percentage Calculator** " has been successfully executed

Q. Giving Balance

Even after helping the shop-keeper to perform addition, to their surprise, students found that the length of the queue and the waiting time at the shop has not considerably reduced. They found that students were not giving the exact amount (as there was a shortage of coins) and the shop-keeper found it difficult to calculate the balance amount to be given to students. The first year students decided to put their programming skills to practice and they decided to write a program to calculate the balance amount to be given to students. Can you help them out in this task?

Source Code

```
a=input("");
b=input("");
c=b-a;
fprintf("Balance is %0.2f", c);
```

Sample Input

540
600

Sample Output

Balance is 60.00

Result

Thus, Program "**Giving Balance**" has been successfully executed

Q. Celsius to fahrenheit converter

Can you help me to convert the Celsius value in to Fahrenheit value?

Source Code

```
c=input("");
f=(c*9/5)+32;
fprintf("Fahrenheit value is %.1f", f)
```

Sample Input

0

Sample Output

Fahrenheit value is 32.0

Result

Thus, Program "**Celsius to fahrenheit converter**" has been successfully executed

Q. Profit Calculator

Each Sunday, a newspaper agency sells X copies of a certain news paper for Rs. a per copy. The cost to the agency of each newspaper is Rs. b. The agency pays a fixed cost for storage, delivery and so on of Rs. 100 per Sunday. The newspaper agency wants to calculate the profit obtained on Sundays. Can you please help them out by writing a program to compute the profit given X, a and b.

Source Code

```
x=input("");
a=input("");
b=input("");
profit=x*a-(100+x*b);
fprintf("The profit obtained is Rs=%0.2f ", profit);
```

Sample Input

```
1000
2
1
```

Sample Output

The profit obtained is Rs=900.00

Result

Thus, Program " **Profit Calculator** " has been successfully executed

Q. Interest Calculator

Robert deposits Rs. 3000 in State Bank of India for 3 year which earns him an interest of 8%.What is the amount he gets after 3 years?

Source Code

```
p=input("");
r=input("");
n=input("");
i=p*n*r/100;
a=p+i;
printf("Total amount=%0.2f",a);
```

Sample Input

3000
8
3

Sample Output

Total amount=3720.00

Result

Thus, Program " **Interest Calculator** " has been successfully executed

Q. Armstrong Number

Write a program that checks whether a given number is an Armstrong number or not. An Armstrong number is the one in which the sum of cubes of its digit is equal to the number itself. The program takes a number as input and output whether the given number is an Armstrong number or not. For example: (a) 371 is an Armstrong Number as $27+343+1=371$ (b) 153 is an Armstrong Number ($1+125+27=153$) (c) 42 is not an Armstrong Number ($64+8=72$)

Source Code

```
a=input();
n=a;
b=mod(a,10);
a=floor(a/10);
c=mod(a,10);
a=floor(a/10);
d=mod(a,10);
e=(b*b*b)+(c*c*c)+(d*d*d);
if(n==e)
fprintf("Armstrong number");
else
fprintf("\nNot an Armstrong number");
end
```

Sample Input

371

Sample Output

Armstrong number

Result

Thus, Program "**Armstrong Number**" has been successfully executed

Q. Pythagorean triple

You are given three integers, a, b, and c. They need not be given in increasing order. If they form a Pythagorean triple, then print "yes", otherwise, print "no". Please note that the output message is in small letters.

Source Code

```
a=input();
b=input("");
c=input("");
x=a*a;
y=b*b;
z=c*c;
if(x==y+z)
fprintf("yes");
else if(y==x+z)
fprintf("yes");
else if(z==x+y)
fprintf("yes");
else fprintf("no");
end
end
end
```

Sample Input

```
3
4
5
```

Sample Output

```
yes
```

Result

Thus, Program "**Pythagorean triple**" has been successfully executed

Q. Alice in wonderland

Alice was bored that day, so she was sitting on the river bank. Suddenly she notices a talking, White Rabbit with a packet watch. It ran fast , and she followed it, down a rabbit hole. She fell in to the hole and found a magical wonderland with dark trees, beautiful flowers. She found many ways numbered from 1,2,3?18. She was confused which is the right way that will lead her to her home. A talking bird said a two digit number (say 23) and asked her to find the sum of the digits($2+3=5$) and that numbered way will lead to her home. Alice was already confused, so pls help Alice in finding the route to her home?

Source Code

```
a=input();  
b=mod(a,10);  
c=floor(a/10);  
d=b+c;  
fprintf("%d",d);
```

Sample Input

99

Sample Output

18

Result

Thus, Program "**Alice in wonderland**" has been successfully executed

Q. Splitting into Teams

During the Physical Education hour, PD sir Mr. Sundarraj has decided to conduct some team games. He wants to split the students in the class into equal sized teams. In some cases, there may be some students who are left out from teams and he wanted to use the left out students to assist him in conducting the team games. For instance, if there are 50 students in the class and if the class has to be divided into 7 equal sized teams, 7 students will be there in each team and 1 student will be left out. PD sir asks your help to automate this team splitting task. Can you please help him out?

Source Code

```
a=input("");
b=input("");
c=floor(a/b);
d=mod(a,b);
fprintf("Total %d per teams and %d left out to assist \n",c,d);
```

Sample Input

```
60
8
```

Sample Output

```
Total 7 per teams and 4 left out to assist
```

Result

Thus, Program "**Splitting into Teams**" has been successfully executed

Q. Fencing the ground

The college ground is rectangular in shape. The Management decides to build a fence around the ground. In order to help the construction workers to build a straight fence, they planned to place a thick rope around the ground. They wanted to buy only the exact length of the rope that is needed. They also wanted to cover the entire ground with a thick carpet during rainy season. They wanted to buy only the exact quantity of carpet that is needed. They requested your help.

Source Code

```
a=input("");
b=input("");
c=2*(a+b);
d=a*b;
fprintf("Length of the rope is %d and quantity of carpet is %d",c,d);
```

Sample Input

50
40

Sample Output

Length of the rope is 180 and quantity of carpet is 2000

Result

Thus, Program "**Fencing the ground**" has been successfully executed

Q. Y2K Problem Detector

Write a program that asks a user for their birth year encoded as two digits (like "62") and for the current year, also encoded as two digits (like "99"). The program is to correctly write out the users age in years. The program will have to determine when a two digit value such as "62" corresponds to a year in the 20th century ("1962") or the 21st century. Here is another run of the program, where "00" is taken to mean the year 2000: Assume that ages are not negative. The age of the person could be 6 or 106 depending on the assumptions. Assume that the age will always be less than or equal to 100

Source Code

```
a=input("");
b=input("");
if b<a
    a=a+1900;
    b=b+2000;
end
c=b-a;
fprintf("Your age is %d",c);
```

Sample Input

```
62
00
```

Sample Output

```
Your age is 38
```

Result

Thus, Program "**Y2K Problem Detector**" has been successfully executed

Q. Computing X

The cost price of n articles is the same as the selling price of x articles. If the profit is p%, then what is the value of x?

Source Code

```
a=input("");
b=input("");
sp=a/(1+b*0.01);
fprintf("\nSelling price=%0.2f",sp);
```

Sample Input

20
25

Sample Output

Selling price=16.00

Result

Thus, Program "**Computing X**" has been successfully executed

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Q. Calculating SP

A man buys a cycle for Rs. A and sells it at a loss of b%. What is the selling price of the cycle?

Source Code

```
a=input();  
b=input("");  
sp=(100-b)*a/100;  
fprintf("\nSelling Price=%0.2f",sp);
```

Sample Input

```
1400  
15
```

Sample Output

```
Selling Price=1190.00
```

Result

Thus, Program "**Calculating SP**" has been successfully executed

Q. Average sale

A grocer has a sale of Rs.S1,Rs.S2, Rs.S3,Rs.S4, Rs.S5 for 5 consecutive months. How much sale he must have in the sixth month so that he gets an average sale of Rs.X?

Source Code

```
s1=input("");
s2=input("");
s3=input("");
s4=input("");
s5=input("");
average=input("");
month=input("");
s6=(month*average)-(s1+s2+s3+s4+s5);
fprintf("\nSale amount for 6th month is=%d\n",s6);
```

Sample Input

```
1000
2000
3000
4000
5000
4000
6
```

Sample Output

Sale amount for 6th month is=9000

Result

Thus, Program "**Average sale**" has been successfully executed

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Q. DINING ROOM PERIMETER

A rectangular dining room is 5 m wide and 6 m long. Find the perimeter of the room?

Source Code

```
length=input("");
width=input("");
p=2*(length+width);
fprintf("Perimeter=%d", p);
```

Sample Input

5
6

Sample Output

Perimeter=22

Result

Thus, Program "**DINING ROOM PERIMETER**" has been successfully executed

Q. Divisibility

Write a program that prints "yes" if the given integer is neither divisible by 7 nor 3 and "no" otherwise

Source Code

```
a=input("");
if ~(or(mod(a,7)==0,mod(a,3)==0));
fprintf("yes");
else
    fprintf("no");
end
```

Sample Input

21

Sample Output

no

Result

Thus, Program "**Divisibility**" has been successfully executed

Q. DIVISIBLE BY 9 and 4

Write a program that prints "yes" if the given integer is divisible by 9 and 4 , otherwise print "no".

Source Code

```
a=input("");
if (eq(mod(a,9),0) && eq(mod(a,4),0));
fprintf("yes");
else
    fprintf("no");
end
```

Sample Input

36

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 9 and 4**" has been successfully executed

Q. Sum of EVEN numbers

Write a MATLAB program to add all the even numbers from 0 to the user input number. If user input is 100 then $(0+2+4+6+\dots+100 = 2550)$

Source Code

```
i = 0; sum = 0;  
n = input(");  
while i <= n  
if mod(i,2)==0  
    sum = sum + i;  
end  
i = i + 1;  
end  
fprintf("\nSum of all Even numbers = %d", sum);
```

Sample Input

20

Sample Output

Sum of all Even numbers = 110

Result

Thus, Program "**Sum of EVEN numbers**" has been successfully executed

Q. Greatest number of N

Write a program to find the greatest of N numbers. (Hint: Enter 0 to stop)

Source Code

```
a=1;
max=0;
while ne(a,0)
a=input(" ");
if gt(a,max)
    max = a;
end
end
fprintf('Maximum number is %d',max);
```

Sample Input

```
12
8
24
0
```

Sample Output

```
Maximum number is 24
```

Result

Thus, Program " **Greatest number of N** " has been successfully executed

Q. Order Checker

Bobs Discount Bolts charges the following prices : 5 rupees per bolt , 3 rupees per nut ,1 rupee per washer. Write a program that asks the user for the number of bolts, nuts, and washers in their purchase and then calculates and prints out the total. As an added feature, the program checks the order. A correct order must have at least as many nuts as bolts and at least twice as many washers as bolts, otherwise the order has an error. For an error the program writes out "check the Order: too few nuts" or "Check the Order : too few washers" as appropriate. Both error messages are written if the order has both errors. If there are no errors the program writes out "Order is OK." In all cases the total price in rupees (of the specified number of items) is written out. (Hint Don not use any operator symbol (<,<=,>,>=,+,-,*). Use the functions)

Source Code

```
a=input();
b=input();
c=input();
if and(b<a,c<prod(2,a))
    fprintf('Check the Order : too few nuts\n');
    fprintf('Check the Order : too few washers\n');
else if and(b>=a,c>=prod(2,a))
    fprintf('Order is OK \n');
else if (c<prod(2,a))
    fprintf('Check the Order : too few washers\n');
else
    fprintf('Check the Order : too few nuts\n');
end
end
end
d=plus(times(a,5),times(b,3));
f=plus(d,times(c,1));
fprintf('Total cost %0.2f\n',f);
```

Sample Input

12
8
24

Sample Output

Check the Order : too few nuts
Total cost 108.00

Result

Thus, Program "**Order Checker**" has been successfully executed

Q. Order Checker

Bobs Discount Bolts charges the following prices : 5 rupees per bolt , 3 rupees per nut ,1 rupee per washer. Write a program that asks the user for the number of bolts, nuts, and washers in their purchase and then calculates and prints out the total. As an added feature, the program checks the order. A correct order must have at least as many nuts as bolts and at least twice as many washers as bolts, otherwise the order has an error. For an error the program writes out "check the Order: too few nuts" or "Check the Order : too few washers" as appropriate. Both error messages are written if the order has both errors. If there are no errors the program writes out "Order is OK." In all cases the total price in rupees (of the specified number of items) is written out. (Hint Don not use any operator symbol (<,<=,>,>=,+,-,*). Use the functions)

Source Code

```
a=input();
b=input();
c=input();
if and(b<a,c<prod(2,a))
    fprintf('Check the Order : too few nuts\n');
    fprintf('Check the Order : too few washers\n');
else if and(b>=a,c>=prod(2,a))
    fprintf('Order is OK \n');
else if (c<prod(2,a))
    fprintf('Check the Order : too few washers\n');
else
    fprintf('Check the Order : too few nuts\n');
end
end
end
d=plus(times(a,5),times(b,3));
f=plus(d,times(c,1));
fprintf('Total cost %0.2f\n',f);
```

Sample Input

12
8
24

Sample Output

Check the Order : too few nuts
Total cost 108.00

Result

Thus, Program "**Order Checker**" has been successfully executed

Q. Maximum

You are advised to write a program to find the maximum of 3 numbers. If the user enters the same number you should notify the same
(Hint : Should not use `>`,`>=`,`<`,`<=` , `&&` symbols. Rather use operator functions)

Source Code

```
a=input("");
b=input("");
c=input("");
if and(eq(a,b),eq(b,c))
    fprintf('All are equal \n');
else
    if and(gt(a,b),gt(b,c))
        fprintf(' %d is the greater number \n',a);
    else
        if and(gt(b,c), gt(b,a))
            fprintf(' %d is the greater number \n',b);
        else
            fprintf(' %d is the greater number \n',c);
        end
    end
end
```

Sample Input

3
4
5

Sample Output

5 is the greater number

Result

Thus, Program "**Maximum**" has been successfully executed

Q. Swapping

Write a program that swaps 2 variables without using third variable (Hint : Use arithmetic functions instead of +, -)

Source Code

```
a=input("");
b=input("");
fprintf("\na=%d\nb=%d",a,b);
a=plus(a,b);
b=minus(a,b);
a=minus(a,b);
fprintf("\na=%d\nb=%d\n",a,b);
```

Sample Input

```
21
7
```

Sample Output

```
a=21
b=7
a=7
b=21
```

Result

Thus, Program "**Swapping**" has been successfully executed

Q. DIVISIBLE BY 7 and 3

Write a program that prints "yes" if the given integer is divisible by 7 and 3 and "no" otherwise. (Hint : Use eq and && operator function)

Source Code

```
a=input("");
if (eq(mod(a,7),0) && eq(mod(a,3),0));
fprintf("yes \n");
else
    fprintf("no\n");
end
```

Sample Input

42

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 7 and 3**" has been successfully executed

Q. DIVISIBLE BY 2 AND 3

Write a program that prints "yes" if the given integer is divisible by 2 and 3 and "no" otherwise. (Hint : Use eq function)

Source Code

```
a=input("");
if and(eq(mod(a,2),0),eq(mod(a,3),0));
fprintf("yes \n");
else
    fprintf("no\n");
end
```

Sample Input

6

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 2 AND 3**" has been successfully executed

Q. Differenzia

In a country named "Differenzia", the minors and senior citizens are not eligible to vote. Only people aged between 18 to 60 (both inclusive) are eligible to vote. Write a program to determine a person in Differenzia is eligible to vote. (Hint: must use ge, le, and functions)

Source Code

```
b=input("");
if and(ge(b,18), le(b,60))
    fprintf("Eligible \n");
else
    fprintf("Not Eligible \n");
end
```

Sample Input

21

Sample Output

Eligible

Result

Thus, Program "**Differenzia**" has been successfully executed

Q. DIVISIBLE BY 2 OR 3

Write a program that prints "yes" if the given integer is divisible by 2 or 3 and "no" otherwise.

Source Code

```
a=input("");
if or(mod(a,2)==0,mod(a,3)==0);
fprintf("yes \n");
else
    fprintf("no\n");
end
```

Sample Input

21

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 2 OR 3**" has been successfully executed

Q. DIVISIBLE BY 2 OR 3

Write a program that prints "yes" if the given integer is divisible by 2 or 3 and "no" otherwise.

Source Code

```
a=input("");
if or(mod(a,2)==0,mod(a,3)==0);
fprintf("yes \n");
else
    fprintf("no\n");
end
```

Sample Input

21

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 2 OR 3**" has been successfully executed

Q. Divisibility

Write a Mathslab program that prints "yes" if the given integer is divisible by 3 and "no" otherwise.

Source Code

```
a=input("");
if mod(a,3)==0;
fprintf('yes');
else
    fprintf('no');
end
```

Sample Input

24

Sample Output

yes

Result

Thus, Program "**Divisibility**" has been successfully executed

Q. Order Checker

Bobs Discount Bolts charges the following prices : 5 rupees per bolt , 3 rupees per nut ,1 rupee per washer. Write a program that asks the user for the number of bolts, nuts, and washers in their purchase and then calculates and prints out the total. As an added feature, the program checks the order. A correct order must have at least as many nuts as bolts and at least twice as many washers as bolts, otherwise the order has an error. For an error the program writes out "check the Order: too few nuts" or "Check the Order : too few washers" as appropriate. Both error messages are written if the order has both errors. If there are no errors the program writes out "Order is OK." In all cases the total price in rupees (of the specified number of items) is written out.

Source Code

```
a=input("");
b=input("");
c=input("");
if and(b<a,c<(2*a))
    fprintf("\nCheck the Order : too few nuts");
    fprintf("\nCheck the Order : too few washers");
else if and(b>=a,c>=(2*a))
    fprintf("\nOrder is OK");
else if c<(2*a)
    fprintf("\nCheck the Order : too few washers");
else
    fprintf("\nCheck the Order : too few nuts");
end
    end
end
d=(a*5)+(b*3)+(c*1);
fprintf("\nTotal cost is %0.2f",d);
```

Sample Input

```
12
8
24
```

Sample Output

```
Check the Order : too few nuts
Total cost is 108.00
```

Result

Thus, Program "**Order Checker**" has been successfully executed

Q. Sorting

Sort the three numbers given by the user.

Source Code

```
a=input("");
b=input("");
c=input("");
if(a < b)
    if(a < c)
        if(b < c)
            fprintf("%d %d %d",a, b, c);
        else
            fprintf("%d %d %d",a, c, b);
    end
else
    fprintf("%d %d %d",c, a, b);
end
else
    if(b < c)
        if(a < c)
            fprintf("%d %d %d",b, a, c);
        else
            fprintf("%d %d %d",b,c, a);
        end
    else
        fprintf("%d %d %d",c, b, a);
    end
end
```

Sample Input

2
9
7

Sample Output

2 7 9

Result

Thus, Program "**Sorting**" has been successfully executed

Q. Matinee Movie Tickets

Write a program that determines the price of a movie ticket. The program asks for the customers age and for the time on a 24-hour clock (where noon is 12. 00 and 4 : 30PM is 16. 30). The show timings are 10. 15, 13. 30, 18. 00 and 22. 00. The normal adult ticket price is \$8. 00, however the adult matinee price is \$5. 00. Adults are those over 13 years. The normal child ticket price is \$4. 00, however the child matinee price is \$2.00.

Source Code

```
m=13.30;
a=input("");
b=input("");
if b==m
    if a<13
        fprintf('Ticket price is $2.00');
    else
        fprintf('Ticket price is $4.00');
    end
else
    if a<13
        fprintf('Ticket price is $5.00');
    else
        fprintf('Ticket price is $8.00');
    end
end
```

Sample Input

```
12
10.15
```

Sample Output

```
Ticket price is $5.00
```

Result

Thus, Program "**Matinee Movie Tickets**" has been successfully executed

Q. Lab Seating Arrangement

There are 2 programming labs, each with the seating capacity of 90. There are 240 students with registration numbers from 1 to 240. All 240 students cannot be accommodated in the labs at the time. It has been decided to conduct theory classes for 60 students every week. It has been decided to conduct theory classes for all the students with registration numbers being a multiple of 4. Students with registration numbers from 1 to 120 with registration numbers not a multiple of 4 need to be seated in Programming Lab I and students with registration numbers from 121 to 240 with registration numbers not a multiple of 4 need to be seated in Programming Lab II. Given the registration number of a student, write a program to specify the lab or hall in which to be seated.

Source Code

```
a=input("");
if mod(a,4)==0
    fprintf('Theory class \n');
else
    if (a<=120)
        fprintf('Lab I \n');
    else if and(a>120,a<=240)
        fprintf('Lab II\n');
    else
        fprintf('Wrong register number\n');
    end
end
end
```

Sample Input

160

Sample Output

Theory class

Result

Thus, Program "**Lab Seating Arrangement**" has been successfully executed

Q. Holidays in a year

In an Engineering Institution, the college management has decided not to work on all Saturdays and Sundays. All public holidays are also nonworking. Assume that the first day of the year is a Sunday and it is numbered as 1. Given a day and details regarding whether it is a public holiday or not, write a Mathslab program to determine whether the college is working on that day or not. Sample input Enter the day number : 10 Is it a public holiday? Enter 1 for yes and 0 for no : 0 Output Working day

Source Code

```
a=input("");
b=input("");
if b==1
    fprintf('Holiday \n');
else
    if or(mod(a,7)==0,mod(a-1,7)==0)
        fprintf('Holiday');
    else
        fprintf('Working day');
    end
end
```

Sample Input

```
13
1
```

Sample Output

```
Holiday
```

Result

Thus, Program "**Holidays in a year**" has been successfully executed

Q. Leap Year

Identify whether the given year is leap year or not

Source Code

```
yr=input();
if (mod(yr,4) == 0)
    if (mod(yr,100) == 0)
        if (mod(yr,400) == 0)
            fprintf('%d is a leap year.\n',yr);
        else
            fprintf('%d is not a leap year.\n',yr);
    end
else
    fprintf('%d is a leap year.\n',yr);
end
else
    fprintf('%d is not a leap year.',yr);
end
```

Sample Input

2015

Sample Output

2015 is not a leap year.

Result

Thus, Program "**Leap Year**" has been successfully executed

Q. Hours-Minutes

Write a program to display hours minutes and seconds in both 12 and 24 hours format
24 Hours format : 23:30:12 Standard format : 11:30:12 pm

Source Code

```
hrs=input("");
if(hrs>24)
fprintf('Invalid hours Entry');
else
mins=input("");
if(mins>60)
fprintf('Invalid minutes Entry');
else
sec=input("");
if(sec>60)
fprintf('Invalid seconds Entry');
else
fprintf('24 Hours Format %d:%d:%d\n',hrs,mins,sec);
if(hrs > 12)
hrs=hrs-12;
fprintf('12 Hours Format %d:%d:%d p.m.\n',hrs,mins,sec);
else
fprintf('12 Hours Format %d:%d:%d a.m.',hrs,mins,sec);
end
end
end
end
```

Sample Input

24
34
34

Sample Output

24 Hours Format 24:34:34
12 Hours Format 12:34:34 p.m.

Result

Thus, Program "**Hours-Minutes**" has been successfully executed

Q. Hours-Minutes

Write a program to display hours minutes and seconds in both 12 and 24 hours format
24 Hours format : 23:30:12 Standard format : 11:30:12 pm

Source Code

```
hrs=input("");
if(hrs>24)
fprintf('Invalid hours Entry');
else
mins=input("");
if(mins>60)
fprintf('Invalid minutes Entry');
else
sec=input("");
if(sec>60)
fprintf('Invalid seconds Entry');
else
fprintf('24 Hours Format %d:%d:%d\n',hrs,mins,sec);
if(hrs > 12)
hrs=hrs-12;
fprintf('12 Hours Format %d:%d:%d p.m.\n',hrs,mins,sec);
else
fprintf('12 Hours Format %d:%d:%d a.m.',hrs,mins,sec);
end
end
end
end
```

Sample Input

24
34
34

Sample Output

24 Hours Format 24:34:34
12 Hours Format 12:34:34 p.m.

Result

Thus, Program "**Hours-Minutes**" has been successfully executed

Q. TAX CALCULATOR

Calculate the tax to be paid by an employee with the following details 1. basic salary 2. da percentage 3. hra percentage 4. tax Amount
5. takeHomeSalary Calculate the following and display the values 1. Get the data from the users(basicsalary, dapercentage and hrapercentage) 2. calculateTaxamount (Tax percentage is changing depends on the amount) The default value for taxpercentage is 5%
3. calculate TakeHomeSalary displayData

Source Code

```
basic=input();
da=input();
hra=input();
cross=basic+(basic*da/100)+(basic*hra/100);
if(cross<0)
    fprintf('Wrong input');
else
if (cross<=200000)
    taxpercent=5;
else if(cross>200000 && cross<=500000)
    taxpercent=10;
else if(cross>500000)
    taxpercent=20;
end
end
end
taxamount=(cross*taxpercent)/100;
takehomesalary=cross-taxamount;
fprintf('Basic = %d\n',basic);
fprintf('DA= %0.2f\n',basic*da/100);
fprintf('HRA = %0.2f\n',basic*hra/100);
fprintf('Cross salary = %0.2f\n',cross);
fprintf('Tax amount = %0.2f\n',taxamount);
fprintf('take Home salary = %0.2f',takehomesalary);
```

Sample Input

```
2000
10
20
```

Sample Output

```
Basic = 2000
DA= 200.00
HRA = 400.00
Cross salary = 2600.00
Tax amount = 130.00
take Home salary = 2470.00
```

Result

Thus, Program "**TAX CALCULATOR**" has been successfully executed

Q. Swimming Pool

You are planning to go for swimming classes. You would prefer to enroll in the center which has the swimming pool of a greater area. In the first centre that you visit, the swimming pool is a circular shape(radius-r). In the next centre that you visit, the swimming pool is of a square shape(side-S). Write a program that will help you to make the choice of the swimming pool.

Source Code

```
a= input("");
b= input("");
area1=pi*a*a;
area2=b*b;
if(area1>=area2)
    fprintf("I prefer centre 1");
else
    fprintf("I prefer centre 2");
end
```

Sample Input

```
4
8
```

Sample Output

```
I prefer centre 2
```

Result

Thus, Program "**Swimming Pool**" has been successfully executed

Course:
MATHSLAB

Subject Code:
17

Q. Differenzia

In a country named "Differenzia", the minors and senior citizens are not eligible to vote. Only people aged between 18 to 60 (both inclusive) are eligible to vote. Write a program to determine a person in Differenzia is eligible to vote.

Source Code

```
b=input("");
if(b>=18 && b<=60)
    fprintf('Eligible');
else
    fprintf('Not Eligible');
end
```

Sample Input

12

Sample Output

Not Eligible

Result

Thus, Program "**Differenzia**" has been successfully executed

Q. Maximum

You are advised to write a program to find the maximum of 3 numbers. If the user enters the same number you should notify the same

Source Code

```
a=input();
b=input();
c=input();
if(a==b && b==c)
    fprintf('All are equal \n');
else if(a>b && b>c)
    fprintf(' %d is the greater number',a);
else if(b>c && b>a)
    fprintf(' %d is the greater number',b);
else
    fprintf(' %d is the greater number',c);
end
end
```

Sample Input

```
23
44
55
```

Sample Output

55 is the greater number

Result

Thus, Program "**Maximum**" has been successfully executed

Q. Sum of Positive numbers

Karthik is asked to add all the positive numbers given by Surya. If Surya says any negative number he should ignore the negative numbers and continue the game. The game ends when Surya says zero and Karthik should announce the total value. (Hint: Use Break and Continue statement)

Source Code

```
a=1;
sum=0;
while a
    n=input("");
    if n>0
        sum=sum+n;
    else if n<0
        continue;
    else
        break;
    end
end
fprintf('Sum of all positive numbers is %d',sum);
```

Sample Input

```
5
5
6
1
4
-1
1
0
```

Sample Output

Sum of all positive numbers is 22

Result

Thus, Program "**Sum of Positive numbers**" has been successfully executed

Q. Positive-Negative-Zero

Haris wants to check whether a number given by his friend is positive, negative or zero. Can you help him out?

Source Code

```
number = input("");
if number > 0
    disp('positive');
else if number < 0
    disp('negative');
else
    disp('zero');
end
end
```

Sample Input

5

Sample Output

positive

Result

Thus, Program "**Positive-Negative-Zero**" has been successfully executed

Q. Last Chance Gas

Ali's Last Chance Gas station sits on Route 190 on the edge of Death Valley. There is no other gas station for 400 miles. You are to write a program to help drivers decide if they need gas. The program asks for : 1.Capacity of the tank (in gallons) 2.The available gas in the tank, in gallons as shown in indicator (in %) 3.The miles per gallon of the car. The program then writes out "Get Gas " or "Safe to Proceed" depending on if the car can cross the 200 miles with the gas remaining in the tank.

Source Code

```
a=input("");
b=input("");
c=input("");
d=a*b*c/100;
if d<400
    fprintf('Get Gas');
else
    fprintf('Safe to Proceed');
end
```

Sample Input

```
70
50
25
```

Sample Output

```
Safe to Proceed
```

Result

Thus, Program "**Last Chance Gas**" has been successfully executed

Q. Matinee Movie Tickets

Write a program that determines the price of a movie ticket. The program asks for the customers age and for the time on a 24-hour clock (where noon is 12. 00 and 4 : 30PM is 16. 30). The show timings are 10. 15, 13. 30, 18. 00 and 22. 00. The normal adult ticket price is \$8. 00, however the adult matinee price is \$5. 00. Adults are those over 13 years. The normal child ticket price is \$4. 00, however the child matinee price is \$2.00. Sample input : Enter your age: 8 Enter the show timing : 10.15 Output: Ticket price is \$5.00

Source Code

```
m=13.30;
a=input("");
b=input("");
if b==m
    if a<13
        fprintf('Ticket price is $2.00');
    else
        fprintf('Ticket price is $4.00');
    end
else
    if a<13
        fprintf('Ticket price is $5.00');
    else
        fprintf('Ticket price is $8.00');
    end
end
```

Sample Input

```
8
10.15
```

Sample Output

```
Ticket price is $5.00
```

Result

Thus, Program "**Matinee Movie Tickets**" has been successfully executed

Q. Matinee Movie Tickets

Write a program that determines the price of a movie ticket. The program asks for the customers age and for the time on a 24-hour clock (where noon is 12. 00 and 4 : 30PM is 16. 30). The show timings are 10. 15, 13. 30, 18. 00 and 22. 00. The normal adult ticket price is \$8. 00, however the adult matinee price is \$5. 00. Adults are those over 13 years. The normal child ticket price is \$4. 00, however the child matinee price is \$2.00. Sample input : Enter your age: 8 Enter the show timing : 10.15 Output: Ticket price is \$5.00

Source Code

```
m=13.30;
a=input("");
b=input("");
if b==m
    if a<13
        fprintf('Ticket price is $2.00');
    else
        fprintf('Ticket price is $4.00');
    end
else
    if a<13
        fprintf('Ticket price is $5.00');
    else
        fprintf('Ticket price is $8.00');
    end
end
```

Sample Input

```
8
10.15
```

Sample Output

```
Ticket price is $5.00
```

Result

Thus, Program "**Matinee Movie Tickets**" has been successfully executed

Q. Factorial

You are asked to generate a program to get an input number (n) from the user and find the value $1*2*3*4*5*..n$. using For Loop. sample output would be Factorial of 5 is 120.

Source Code

```
n=input("");
fact=1;
for i = 1:n
fact=fact*i;
end
fprintf('Factorial of %d is %d',n,fact);
```

Sample Input

5

Sample Output

Factorial of 5 is 120

Result

Thus, Program "**Factorial**" has been successfully executed

Q. Factorial

You are asked to generate a program to get an input number (n) from the user and find the value $1*2*3*4*5*..n$. using while Loop.

Source Code

```
n=input();
fact =1;
i=1;
while (i<=n)
fact=fact*i;
i=i+1;
end
fprintf('Factorial of %d is %d',n,fact);
```

Sample Input

5

Sample Output

Factorial of 5 is 120

Result

Thus, Program "**Factorial**" has been successfully executed

Q. Calculation

A mathematics faculty has conducted a small game in his class. He will give two numbers and option numbers. The students need to do the calculation and give the final value. (option) 1. Addition 2. Subtraction 3. Multiplication 4. Division 0. Exit

Source Code

```
a=input ("");
b=input("");
in=input("");
switch in
    case 1
        c=a+b;
        fprintf("%d",c);
        break;
    case 2
        c=a-b;
        fprintf("%d",c);
        break;
    case 3
        c=a*b;
        fprintf("%d",c);
        break;
    case 4
        c=a/b;
        fprintf("%d",c);
        break;
    otherwise
        disp('End');
        break;
end
```

Sample Input

5
5
1

Sample Output

10

Result

Thus, Program "**Calculation**" has been successfully executed

Q. Printing Right Triangles

You are given a positive integer N. You have to print N rows as follows. The first row consists of one 0, the second row 2 zeroes, and so on, until the Nth row, which consists of N zeroes.

Source Code

```
n=input("");
for i=1:n
for j=1:i
fprintf('0')
end
fprintf('\n');
end
```

Sample Input

2

Sample Output

0
00

Result

Thus, Program "Printing Right Triangles" has been successfully executed

Q. Ring Game

In the standard version of the math game RING, players begin counting and whenever a player reaches a number that has seven as a digit or is divisible by seven, he says "RING" instead of the number. Numbers such as seventy require the player to say "RING RING": Once because the number contains the digit "7" and once because the number is divisible by "7". However, if one of the two properties holds more than once (for example, the number 771 contains the digit 7 twice) the player only says "RING" once for each property that holds. SRM team is about to participate in the game of RING and the SRM RING team coach requests you to help him in automating this training program by writing a program. Can you please help him out?

Source Code

```
n=input();
num=n;
i=0;
while n~=0
    if (mod(n,10)==7)
        i=i+1;
    end
    n=floor(n/10);
end
if(i>0)
    fprintf('Ring ');
end
if(mod(num,7)==0)
    fprintf('Ring');
end
```

Sample Input

77

Sample Output

Ring Ring

Result

Thus, Program "**Ring Game**" has been successfully executed

Q. Sum of integers

Determine the number of consecutive integer numbers which when added together will give a value equal to or just less than a maximum value that the user gives. Hint: The number of integers starting from 1 that would add up to maximum value 210 is 20. That is, $1 + 2 + 3 + 4 + \dots + 20 = 210$ Sample input Enter the max. value :10 Out put $1 + 2 + 3 + 4 = 10$ Total no.of integers : 4

Source Code

```
i = 1; sum = 0;
max = input("");
while sum < max
sum = sum + i;
if sum <= max
fprintf ('%d',i);
end
i = i + 1;
if sum+i <= max
    fprintf (' + ');
end
end
if sum>max
i=i-1;
sum=sum-i;
fprintf(' = %d', sum);
else
    fprintf(' = %d', sum);
end
num = i-1;
fprintf ('\nTotal no.of integers : %d', num);
```

Sample Input

10

Sample Output

$1 + 2 + 3 + 4 = 10$
Total no.of integers : 4

Result

Thus, Program "**Sum of integers**" has been successfully executed

Q. Prime

Use MATLABS prime function to write out the first n prime numbers: Get the value of n from the user.

Source Code

```
n=input("");
count = 0;
i = 1;
while count < n
if isprime(i)
disp(i);
count = count + 1;
end;
i = i + 1;
end;
```

Sample Input

4

Sample Output

2
3
5
7

Result

Thus, Program " Prime " has been successfully executed

Q. PERFECT NUMBER

Get an input from the user below 500 and check whether the given input is perfect number or not. Example : "Perfect number is a positive number which sum of all positive divisors excluding that number." For example 6 is Perfect Number since divisor of 6 are 1, 2 and 3. Sum of its divisor is $1 + 2 + 3 = 6$. Input Format Enter the input number (Less than 500):

Source Code

```
u=1;
sum=0;
i= input("");
if(i<=500)
while(u<=500)
    if(u<i)
        if(mod(i,u)==0)
            sum=sum+u;
    end
end
u=u+1;
end
if(sum==i)
    fprintf("%d is a perfect number.",i);
else
    fprintf("%d is not a perfect number.",i);
end
else
    fprintf('You have entered the number greater than 500');
end
```

Sample Input

4

Sample Output

4 is not a perfect number.

Result

Thus, Program "**PERFECT NUMBER**" has been successfully executed

Q. Buzz Game

In the standard version of the math game Buzz, players begin counting and whenever a player reaches a number that has seven as a digit or is divisible by seven, he says "Buzz" instead of the number. Numbers such as seventy require the player to say "Buzz Buzz": Once because the number contains the digit "7" and once because the number is divisible by "7". However, if one of the two properties holds more than once (for example, the number 771 contains the digit 7 twice) the player only says "Buzz" once for each property that holds. SRM team is about to participate in the game of Buzz and the SRM Buzz team coach requests you to help him in automating this training program by writing a program. Can you please help him out?

Source Code

```
n=input();
num=n;
i=0;
while n~=0
    if (mod(n,10)==7)
        i=i+1;
    end
    n=floor(n/10);
end
if(i>0)
    fprintf('Buzz ');
end
if(mod(num,7)==0)
    fprintf('Buzz');
end
```

Sample Input

70

Sample Output

Buzz Buzz

Result

Thus, Program "**Buzz Game**" has been successfully executed

Q. Viva on Even Numbers

A maths teacher asks her students to give 3 examples for positive even numbers. When the student specifies a correct answer, his/her score is incremented by 1. When the student specifies a positive odd number, his/her score is decremented by 0.5. When the student specifies a negative number, he/she will not be given any more chances to correct his or her mistake and his/her score will be decremented by 1. So a student's turn comes to an end when he/she has correctly specified 3 positive even numbers or when the student has specified a negative number. Few students did not know the difference between odd numbers and even numbers and they made many mistakes and so it was difficult for the teacher to maintain the scores. The teacher asks for your help. Can you please help her by writing a program to calculate the score?

Source Code

```
n=1;
score=0;
while (n<=3)
    a=input("");
    if(a>0 && mod(a,2)==0)
        score=score+1;
    else if(a>0 && mod(a,2)~==0)
        score=score-0.5;
    else if(a<0)
        score=score-1;
        break;
    end
end
n=n+1;
end
fprintf('Final score is %0.1f', score);
```

Sample Input

```
2
2
4
```

Sample Output

```
Final score is 3.0
```

Result

Thus, Program "**Viva on Even Numbers**" has been successfully executed

Q. Sum of Positive numbers

Pawan is asked to add all the positive numbers given by Surya. If Surya says any negative number he should insist Surya to say positive numbers and continue the game. The game ends when Surya says zero and Pawan should announce the total value. (Hint: Use Break and Continue statement) Input format : Enter the numbers (0 to exit):

Source Code

```
a=1;
sum=0;
while a
    n=input("");
    if n>0
        sum=sum+n;
    else if n<0
        continue;
    else
        break;
    end
end
fprintf('Sum of all positive numbers is %d',sum);
```

Sample Input

```
5
7
2
3
-2
0
```

Sample Output

Sum of all positive numbers is 17

Result

Thus, Program "**Sum of Positive numbers**" has been successfully executed

Q. PERFECT NUMBER

"Perfect number is a positive number which sum of all positive divisors excluding that number." For example 6 is Perfect Number since divisor of 6 are 1, 2 and 3. Sum of its divisor is $1 + 2 + 3 = 6$ and 28 is also a Perfect Number since $1 + 2 + 4 + 7 + 14 = 28$. Print all the perfect numbers from 1 to n Input format: Enter the value of n:

Source Code

```
u=1;
sum=0;
i=1;
in=input("");
while i<in
    while u<=in
        if(u<i)
            if(mod(i,u)==0)
                sum=sum+u;
            end
        end
        u=u+1;
    end
if(sum==i)
    fprintf("%d is a perfect number.\n",i);
end
i=i+1;
sum=0;
u=1;
end
```

Sample Input

500

Sample Output

6 is a perfect number.
28 is a perfect number.
496 is a perfect number.

Result

Thus, Program "**PERFECT NUMBER**" has been successfully executed

Q. Missing Integer Problem

You are given a sequence of $n-1$ distinct positive integers, all of which are less than or equal to a integer "n". You have to find the integer that is missing from the range $[1,2,\dots,n]$. Input format Enter the value of n: Enter $n-1$ integers

Source Code

```
n=input("");
x = zeros(1,100);
i = 1;
while i<n
    x(i) = input("");
    i = i+1;
    if i==n
        break;
    end
end
x = x(1:i);
total=n*(n+1)/2;
disp(total);
for i=1:n
    total=total-x(i);
end
fprintf('Missing number is : %d', total);
```

Sample Input

```
5
1
2
4
5
```

Sample Output

```
15
Missing number is : 3
```

Result

Thus, Program "**Missing Integer Problem**" has been successfully executed

Q. Sum of ODD numbers

Write a MATLAB program to add all the ODD numbers from 0 to the user input number. If user input is 100 then $(0+2+4+6+\dots+100 = 2550)$

Source Code

```
i = 0; sum = 0;  
n = input(");  
while i <= n  
if mod(i,2)~=0  
    sum = sum + i;  
end  
i = i + 1;  
end  
fprintf('Sum of all ODD numbers = %d', sum);
```

Sample Input

6

Sample Output

Sum of all ODD numbers = 9

Result

Thus, Program "**Sum of ODD numbers**" has been successfully executed

Q. Sum of EVEN numbers

Write a MATLAB program to add all the even numbers from 0 to the user input number. If user input is 100 then $(0+2+4+6+\dots+100 = 2550)$

Source Code

```
i = 0; sum = 0;  
n = input(");  
while i <= n  
if mod(i,2)==0  
    sum = sum + i;  
end  
i = i + 1;  
end  
fprintf('Sum of all Even numbers = %d', sum);
```

Sample Input

20

Sample Output

Sum of all Even numbers = 110

Result

Thus, Program "**Sum of EVEN numbers**" has been successfully executed

Q. Sum of integers

Determine the number of consecutive integer numbers which when added together will give a value equal to or just less than a maximum value that the user gives. Hint: The number of integers starting from 1 that would add up to maximum value 210 is 20. That is,
 $1 + 2 + 3 + 4 + \dots + 20 = 210$

Source Code

```
i = 1; sum = 0;
max = input(" ");
while sum < max
sum = sum + i;
i = i + 1;
end
if sum>max
    i=i-1;
    sum=sum-i;
    fprintf('Sum = %d', sum);
else
    fprintf('Sum = %d', sum);
end
num = i-1;
fprintf ("\nTotal no.of integers : %d", num);
```

Sample Input

8

Sample Output

Sum = 6
Total no.of integers : 3

Result

Thus, Program "**Sum of integers**" has been successfully executed

Q. Numbers

List out the numbers from user input to 1 in reversing order

Source Code

```
n=input("");
for i = n:-1:1
fprintf("%d\n",i);
end
```

Sample Input

8

Sample Output

8
7
6
5
4
3
2
1

Result

Thus, Program "**Numbers**" has been successfully executed

Q. Numbers

List out the odd numbers between 1 and n (in increasing order) also the numbers from n to 1. (n is the user input number.)

Source Code

```
n=input('Enter the number :');
for i = 1:2:n
fprintf("\n%d",i);
end
```

Sample Input

10

Sample Output

Enter the number :

1
3
5
7
9

Result

Thus, Program "**Numbers**" has been successfully executed

Q. Vowels

Write a program to remove all the vowels in the given string

Source Code

```
str1=input("s");
vow={'a','e','i','o','u'};
for i=1:5
str2 = strrep(str1, vow{i}, "");
str1=str2;
end
fprintf("\n%s",str2);
```

Sample Input

eye

Sample Output

y

Result

Thus, Program "**Vowels**" has been successfully executed

Q. VISITOR

In India, it is customary to welcome all guests who come to our house. Techsoft comes out with a new type of personalized doorbell software which would ask the visitor to tell his/her name when they press the calling bell. The inbuilt voice recognition system in the software would convert their voice to text and it would form a new text message combining the welcome message along with the name and text would be converted to voice and the door bells tune would be the text. The technical architect of Techsoft always values the students programming skills and he asks you to implement a part of the project. 1. to get the values of all the three data (name, age, gender) from the user. 2. to display the personalized welcome message.(based on gender(M/F) and based on Age[less than 10 or more]

Source Code

```
name = input("','s');  
age=input("");  
gender=input("','s');  
if(age>10&&gender=='F')  
    fprintf("\nWelcome Ms.%s for Max Lab programming",name);  
else if(age>10&&gender=='M')  
    fprintf("\nWelcome Mr.%s for Max Lab programming",name);  
else  
    fprintf("\nWelcome dear %s for Max Lab programming",name);  
end  
end
```

Sample Input

John
30
M

Sample Output

Welcome Mr.John for Max Lab programming

Result

Thus, Program " **VISITOR** " has been successfully executed

Q. Sub string

In this exercise you are requested to give an input string and a sub string. Check whether that sub string is present in the string given. If you found, then find its position too. If not found mention it too. Also check the no of occurrences of the sub string in the given string.

Source Code

```
str1 = input("','s');  
sub=input("','s');  
if(strfind(str1,sub))  
a=strfind(str1,sub);  
fprintf("\n%d", a);  
fprintf("\nNo.of sub strings : %d", length(a));  
else  
    fprintf("\nNo sub string found");  
end
```

Sample Input

Banana
ana

Sample Output

2
4
No.of sub strings : 2

Result

Thus, Program "**Sub string**" has been successfully executed

Q. Sub String

Write a program which takes input a string and a character or word then replace this character in this string. For Example : 1.If string is ? Hello World? and character is "World" then replace World by Earth the output should be: Hello Earth

Source Code

```
s=input('s');
l=input('s');
p=input('s');
rp=strrep(s,l,p);
fprintf("\n%s",rp);
```

Sample Input

Ram siva
siva
Babu

Sample Output

Ram Babu

Result

Thus, Program "**Sub String**" has been successfully executed

Q. String

Write a program which takes input a string and a character then remove this character in this string. For Example : 1.If string is "Hello World" and character is "l" then the output should be: HeoWord 2.If string is "McDonalds" and character is "s" then the output should be: McDonald

Source Code

```
s=input('s');
l=input('s');
r=strrep(s,l,"");
fprintf("\n%s",r);
```

Sample Input

Balls
s

Sample Output

Ball

Result

Thus, Program "**String**" has been successfully executed

Q. String

Write a program which takes input as string and then implement the logic a. Reverse this string. b. Convert to all upper case c. Convert to all lower case

Source Code

```
name=input("','s');  
fprintf("%s\n",fliplr(name));  
fprintf("%s\n",upper(name));  
fprintf("%s\n",lower(name));
```

Sample Input

Siva

Sample Output

```
aviS  
SIVA  
siva
```

Result

Thus, Program "**String**" has been successfully executed

Q. Palindrome

Check the given input string is palindrome or not. (String should be case sensitive)

Source Code

```
str1=input('s');
rev=flplr(str1);
if strcmp(str1,rev)
fprintf("\n%s is a palindrome",str1);
else
    fprintf("\n%s is not a palindrome",str1);
end
```

Sample Input

Hello World

Sample Output

Hello World is not a palindrome

Result

Thus, Program "**Palindrome**" has been successfully executed

Q. Name display

Write a program that prompts the user for a name. Then display that name ten times. You must use a loop. If the name given is "Mitchell" or "mitchell" display it only Three times.

Source Code

```
str1=input('s');
if strcmp(str1,'Mitchell')
for i=1:3
fprintf('\n%s',str1);
end
else
    for i=1:10
fprintf('\n%s',str1);
end
end
```

Sample Input

James

Sample Output

James
James

Result

Thus, Program "**Name display**" has been successfully executed

Q. Hello

Print a welcome message multiple times in this function. The number of times the welcome message is printed depends on the number of characters in the name.

Source Code

```
name=input('s');
count=length(name);
for i=1:count
    fprintf('Welcome %s\n',name);
end
```

Sample Input

Ram

Sample Output

```
Welcome Ram
Welcome Ram
Welcome Ram
```

Result

Thus, Program "**Hello**" has been successfully executed

Q. Find-Replace

Take a string as input from the user. Take two words as input, the word which the user wants to replace and its substitute. Your task is to write a program that finds and replaces each occurrence of that word.

Source Code

```
s=input('s');
l=input('s');
p=input('s');
rp=strrep(s,l,p);
fprintf("\n%s",rp);
```

Sample Input

Welcome Ram
Ram
Kumar

Sample Output

Welcome Kumar

Result

Thus, Program "**Find-Replace**" has been successfully executed

Q. Equal strings

Write a program to input two strings from user and find whether these strings are equal or unequal.

Source Code

```
str1=input("','s');  
str2=input("','s');  
if strcmp(str1,str2)  
fprintf("\nEqual");  
else  
    fprintf("\nNot equal");  
end
```

Sample Input

```
Hello  
Hello
```

Sample Output

```
Equal
```

Result

Thus, Program "**Equal strings**" has been successfully executed

Q. Equal strings

Write a program to input two strings from user and find whether these strings are equal or unequal.

Source Code

```
str1=input("','s');  
str2=input("','s');  
if strcmp(str1,str2)  
fprintf("\nEqual");  
else  
    fprintf("\nNot equal");  
end
```

Sample Input

```
Hello  
Hello
```

Sample Output

```
Equal
```

Result

Thus, Program "**Equal strings**" has been successfully executed

Q. Count

Alice is giving a sentence to Bob and asking Bob to count the no. of characters in the sentence including blank spaces and no. of characters in the sentence excluding blank spaces Can you help Bob?

Source Code

```
a=input("s");
a1=length(a);
a2=sum(a~= ' ');
fprintf('No.of characters including space=%d',a1);
fprintf("\nNo.of characters excluding space=%d",a2);
```

Sample Input

john jackson

Sample Output

No.of characters including space=12
No.of characters excluding space=11

Result

Thus, Program "**Count**" has been successfully executed

Q. Sum of Subset Integers

Determine the number of consecutive integer numbers which when added together will give a value equal to or just less than a maximum value that the user gives. Hint: The number of integers starting from 1 that would add up to maximum value 220 is 20. That is,
 $1 + 2 + 3 + 4 + \dots + 20 = 210$ If we add 21 with the above the condition clashes since sum = $221 > \text{max.value}$

Source Code

```
function sum=subsetsum()
i = 1; sum = 0;
max = input("");
while sum < max
    sum = sum + i;
    i = i + 1;
end
if sum>max
    i=i-1;
    sum=sum-i;
    fprintf("\nSum = %d", sum);
else
    fprintf("\nSum = %d", sum);
end
end

subsetsum();
```

Sample Input

500

Sample Output

Sum = 496

Result

Thus, Program "**Sum of Subset Integers**" has been successfully executed

Q. Sum of ODD or EVEN numbers

Write a MATLAB program to add all the ODD numbers or add all EVEN numbers for first n numbers based on the requirement of the customer. Case 1: Addition of Even Numbers Case 2: Addition of ODD numbers If user input is 100 then Sum of even numbers is $(0+2+4+6+\dots+100 = 2550)$

Source Code

```
function sum = sumeven(n)
i = 0; sum = 0;
while i <= n
if mod(i,2)==0
    sum = sum + i;
end
i = i + 1;
end
fprintf("\nSum of all Even numbers = %d", sum);
end

function sum = sumodd(n)
i = 0; sum = 0;
while i <= n
if mod(i,2)~=0
    sum = sum + i;
end
i = i + 1;
end
fprintf("\nSum of all Odd numbers = %d", sum);
end

x=input("");
n = input("");
switch x
    case 1
        sumeven(n);
        break;
    case 2
        sumodd(n);
        break;
otherwise
    disp('End');
    break;
end
```

Sample Input

2
100

Sample Output

Sum of all Even numbers = 2500

Result

Thus, Program " **Sum of ODD or EVEN numbers** " has been successfully executed

Q. Simple Interest

A marketing agent is advertising about his products to the customers on door to door basis. He sells the products by EMI basis with the simple interest rate of 8% per annum. Help him to calculate the Simple interest for a given principal amount using the function called SI.
(Note Declare the RATE as global variable)

Source Code

```
function si = si(Principal,year)
global RATE;
    si=Principal*year*RATE/100;
end

global RATE;
RATE=8;
x1=input("");
x2=input("");
interest = si(x1,x2);
fprintf("\nSimple Interest=%0.2f",interest);
```

Sample Input

```
8000
5
```

Sample Output

```
Simple Interest=3200.00
```

Result

Thus, Program "**Simple Interest**" has been successfully executed

Q. Nested Function

Write a Function to calculate the quadratic function of an equation $x_1 = (-b + \sqrt{b^2 - 4ac}) / (2a)$ & $x_2 = (-b - \sqrt{b^2 - 4ac}) / (2a)$. The function has to call an another function that calculates the $\sqrt{b^2 - 4ac}$

Source Code

```
function dis = disc(a,b,c)
dis = sqrt(b^2 - 4*a*c);
end

function [x1,x2] = quadratic(a,b,c)
d= disc(a,b,c);
x1 = (-b + d) / (2*a);
fprintf("\nx1=%0.2f",x1);
x2 = (-b - d) / (2*a);
fprintf("\nx2=%0.2f",x2);
end

a=input("");
b=input("");
c=input("");
quadratic(a,b,c);
```

Sample Input

```
2
4
-4
```

Sample Output

```
x1=0.73
x2=-2.73
```

Result

Thus, Program "**Nested Function**" has been successfully executed

Q. Global Variable

Write a function to calculate the average of 10 numbers given by the user. You must declare a global variable named TOTAL with the value 10;

Source Code

```
function avg = average(nums)
global TOTAL
avg = sum(nums)/TOTAL;
end
```

```
global TOTAL;
TOTAL=10;
n = input("");
av = average(n);
fprintf("\nAverage=%0.1f", av);
```

Sample Input

[1 2 3 4 5 6 7 8 9 10]

Sample Output

Average=5.5

Result

Thus, Program "**Global Variable**" has been successfully executed

Q. FindMin

Find the minimum of the five numbers given as input using function

Source Code

```
function min = mymin(n1,n2,n3,n4,n5)
min = n1;
if(n2 < min)
    min = n2;
end
if(n3 < min)
    min = n3;
end
if(n4 < min)
    min = n4;
end
if(n5 < min)
    min = n5;
end
end

x1=input("");
x2=input("");
x3=input("");
x4=input("");
x5=input("");
min1= mymin(x1,x2,x3,x4,x5);
fprintf("\nMin=%d",min1);
```

Sample Input

1
2
3
4
5

Sample Output

Min=1

Result

Thus, Program "**FindMin**" has been successfully executed

Q. FindMax

Find the maximum of the five numbers given as input using function

Source Code

```
function max = mymax(n1,n2,n3,n4,n5)
max = n1;
if(n2 > max)
    max = n2;
end
if(n3 > max)
    max = n3;
end
if(n4 > max)
    max = n4;
end
if(n5 > max)
    max = n5;
end
end

x1=input("");
x2=input("");
x3=input("");
x4=input("");
x5=input("");
max1= mymax(x1,x2,x3,x4,x5);
fprintf("\nMax=%d",max1);
```

Sample Input

1
2
3
4
5

Sample Output

Max=5

Result

Thus, Program "**FindMax**" has been successfully executed

Q. Calculations

A mathematics faculty has conducted a small game in his class. He will give two numbers and option numbers. The students need to do the calculation using function and give the final value. (option) 1. Addition 2. Subtraction 3. Multiplication 4. Division 0. Exit Hint: create 4 functions namely, add(), sub(), mul(), div() with or without parameter

Source Code

```
function out=add(a,b)
out=a+b;
end
function out=sub(a,b)
out=a-b;
end
function out=mul(a,b)
out=a*b;
end
function out=div(a,b)
out=a/b;
end

a=input ("");
b=input("");
in=input("");
switch in
    case 1
        c=add(a,b);
        fprintf('%d \n',c);
        break;
    case 2
        c=sub(a,b);
        fprintf("\n%d",c);
        break;
    case 3
        c=mul(a,b);
        fprintf("\n%d",c);
        break;
    case 4
        c=div(a,b);
        fprintf("\n%d",c);
        break;
    otherwise
        disp("\nEnd");
        break;
end
```

Sample Input

8
4
4

Sample Output

2

Result

Thus, Program "**Calculations**" has been successfully executed

Q. Average of Vector array

Write a function to calculate the average of vector array elements .

Source Code

```
function y = average(x)
y = sum(x)/length(x);
end
z = input(" ");
fprintf("\nAverage =%d", average(z));
```

Sample Input

[1 2 3 4 5]

Sample Output

Average =3

Result

Thus, Program "**Average of Vector array**" has been successfully executed

Q. Average Function

Write a function to calculate the average of n numbers given by the user.

Source Code

```
function avg = average(nums)
TOTAL=numel(nums);
avg = sum(nums)/TOTAL;
end
n = input("");
av = average(n);
fprintf("\nAverage=%0.1f", av);
```

Sample Input

[34 45 32]

Sample Output

Average=37.0

Result

Thus, Program "**Average Function**" has been successfully executed

Q. Solve the qualtion

Solve the following equation using root function $x^2 - 5 = 0$. The input format is enter the coefficients of the equation

Source Code

```
x=input();
x = roots(x);
fprintf("\nx=%d",x);
```

Sample Input

[1 -5]

Sample Output

x=5

Result

Thus, Program "**Solve the qualtion**" has been successfully executed

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Q. Solve the equations

Solve the equations : $10x + 18y = 10$ $6x - 12y = 8$ The input format is Enter the coefficient matrix:Enter the column vector:

Source Code

```
A = input("");
b = input("");
x=A \ b
```

Sample Input

```
[10, 18; 6, -12]
[10;8]
```

Sample Output

x =

```
1.157895
-0.087719
```

Result

Thus, Program "**Solve the equations**" has been successfully executed

Course:
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Subject Code:
17

Q. Solve the Equation

Solve the following equation using root function $x^2-4=0$. The input format is enter the coefficients of the equation

Source Code

```
x=input();
x = roots(x);
fprintf("\nx=%d",x);
```

Sample Input

[1 0 -4]

Sample Output

```
x=-2
x=2
```

Result

Thus, Program "**Solve the Equation**" has been successfully executed

Q. Solve the equations

Solve the following equation using root function $7x-14=0$. The input format is Enter the coefficients of the equation:

Source Code

```
x=input();  
x = roots(x);  
fprintf("\nx=%d",x);
```

Sample Input

[7 -14]

Sample Output

x=2

Result

Thus, Program "**Solve the equations**" has been successfully executed

Q. Solve the equations

Solve the equations ? $5a + 9b = 5$. $3b - 6b = 4$ The input format is Enter the coefficient matrix:Enter the column vector:

Source Code

```
A = input("");
b = input("");
x=A \ b
```

Sample Input

```
[5, 9; 3, -6]
[5;4]
```

Sample Output

x =

```
1.157895
-0.087719
```

Result

Thus, Program "**Solve the equations**" has been successfully executed

Course:
MATHSLAB

Subject Code:
17

Q. Solve the equations

Solve the equations : $5x + 9y = 5$ $3x - 6y = 4$ Input format: Enter the coefficient matrix: Enter the column vector:

Source Code

```
A = input("");
b = input("");
x=A \ b
```

Sample Input

```
[5, 9; 3, -6]
[5;4]
```

Sample Output

x =

```
1.157895
-0.087719
```

Result

Thus, Program "**Solve the equations**" has been successfully executed

Course:
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Q. Linear Equation

Solve the following equation using root function $x^2-4x+4=0$ The input format Enter the coefficients of the equation:

Source Code

```
x=input();  
x = roots(x);  
fprintf("\nx=%0.2f",x);
```

Sample Input

[1 -4 4]

Sample Output

```
x=2.00  
x=2.00
```

Result

Thus, Program " **Linear Equation** " has been successfully executed

Q. Higher order quation

Solve the fourth order equation $2r^4+7r^3-3r^2-18r$ and the input format is:- Enter the coefficients of the equation:

Source Code

```
r=input("");
s = roots(r);
% converting the roots to double type
disp('Numeric value of first root'), disp(double(s(1)));
disp('Numeric value of second root'), disp(double(s(2)));
disp('Numeric value of third root'), disp(double(s(3)));
```

Sample Input

[2 7 -3 -18]

Sample Output

Numeric value of first root

1.5000

Numeric value of second root

-3.0000

Numeric value of third root

-2.0000

Result

Thus, Program "**Higher order quation**" has been successfully executed

Q. Fourth Order Equations

Solve the fourth order equation $x^4 - 7x^3 + 3x^2 - 5x + 9 = 0$ and the input format is enter the coefficients of the equation

Source Code

```
v=input();  
s = roots(v);  
% converting the roots to double type  
disp('Numeric value of first root'), disp(double(s(1)));  
disp('Numeric value of second root'), disp(double(s(2)));  
disp('Numeric value of third root'), disp(double(s(3)));  
disp('Numeric value of fourth root'), disp(double(s(4)));
```

Sample Input

[1, -7, 3, -5, 9]

Sample Output

Numeric value of first root

6.6304

Numeric value of second root

1.0598

Numeric value of third root

-0.34509 + 1.07784i

Numeric value of fourth root

-0.34509 - 1.07784i

Result

Thus, Program "Fourth Order Equations" has been successfully executed

Q. Fourth Order Equations

Solve the fourth order equation $2x^4 - 5x^3 + 6x^2 - 5x + 9 = 0$. The input format is Enter the coefficients of the equation:

Source Code

```
v=input();  
s = roots(v);  
% converting the roots to double type  
disp('Numeric value of first root'), disp(double(s(1)));  
disp('Numeric value of second root'), disp(double(s(2)));  
disp('Numeric value of third root'), disp(double(s(3)));  
disp('Numeric value of fourth root'), disp(double(s(4)));
```

Sample Input

[2, 5, 6, -5, 9]

Sample Output

```
Numeric value of first root  
-1.7318 + 1.5886i  
Numeric value of second root  
-1.7318 - 1.5886i  
Numeric value of third root  
0.48182 + 0.76330i  
Numeric value of fourth root  
0.48182 - 0.76330i
```

Result

Thus, Program "Fourth Order Equations" has been successfully executed

Q. Voltage

If the current $I = 0.4$ A and the resistance $R = 500$ ohms, then Find the voltage. The input format Enter the I :Enter the R :

Source Code

```
I=input();
R=input();
V=I*R;
fprintf("\nThe value of voltage:%0.1f volts",V);
```

Sample Input

0.4
500

Sample Output

The value of voltage:200.0 volts

Result

Thus, Program "**Voltage**" has been successfully executed

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Q. Voltage

If the current $I = 0.2$ A and the resistance $R = 1000$ ohms, then Find the voltage. The input format is Enter the I :Enter the R :

Source Code

```
I=input("");
R=input("");
V=I*R;
fprintf("\nThe value of voltage:%0.1f volts",V);
```

Sample Input

0.8
100

Sample Output

The value of voltage:80.0 volts

Result

Thus, Program "**Voltage**" has been successfully executed

Q. Types of quadratic roots

You will be familiar with the following formula for finding the roots of a quadratic. $x = -b + [(b^2 - 4ac)^{1/2}]$ and $x = -b - [(b^2 - 4ac)^{1/2}]$. The term under the square root is called the discriminant and can be used to determine the type of roots the quadratic has. If the discriminant is positive then the polynomial has two real roots; If the discriminant is zero that the polynomial has one repeated root; Otherwise the discriminant is negative and the polynomial has two complex roots. Write a function that will tell a user the number of real roots a quadratic equation has.

Source Code

```
a=input("");
b=input("");
c=input("");
d=(b*b-4*a*c);
if d>0
    fprintf('The polynomial has two real roots');
else if d==0
    fprintf('The polynomial has one repeated root ');
else
    fprintf('The polynomial has two complex roots ');
end
end
```

Sample Input

```
1
3
2
```

Sample Output

The polynomial has two real roots

Result

Thus, Program "Types of quadratic roots" has been successfully executed

Q. Trigonometric identity

A trigonometric identity is given by: $\cos^2(x/2) = \tan(x) + \sin(x) / (2 \tan(x))$ Show that the identity is correct by calculating each side of the equation, substituting $x=\pi/5$

Source Code

```
x=pi/5;  
L=cos(x/2)^2;  
fprintf('LHS=%0.2f\n', L);  
R=(tan(x)+sin(x))/(2*tan(x));  
fprintf('RHS=%0.2f', R);
```

Sample Input

Sample Output

LHS=0.90
RHS=0.90

Result

Thus, Program "Trigonometric identity" has been successfully executed

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Q. Resistance

If $V = 220$ V and $I = 5$ A, then find the resistance of the circuit. The input format Enter the V :Enter the I :

Source Code

```
V=input();  
I=input();  
R=V/I;  
fprintf("\nThe value of Resistance :%0.3f ohms",R);
```

Sample Input

```
220  
5
```

Sample Output

```
The value of Resistance :44.000 ohms
```

Result

Thus, Program "**Resistance**" has been successfully executed

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Q. Pythagorean Theorem

In the right triangle $xy=16$ cm (base) and $xz=50$ cm (height). Define xy and xz as variables, and then: (a) Using the Pythagorean Theorem, calculate yz by typing one line in the Command Window. (b) Using yz from part (a) and the acosd function, calculate the angle xyz i.e. α in degrees by typing one line in the Command Window.

Source Code

Sample Input

```
16  
50
```

Sample Output

```
xy=xz=  
The value of b=52.50  
The value of alpha = 17.74
```

Result

Thus, Program "**Pythagorean Theorem**" has been successfully executed

Q. Current

If $V = 110$ V and $R = 22000$ ohms, then find the current flows through the circuit. The input format Enter the V :Enter the R :

Source Code

```
V=input("");
R=input("");
I=V/R;
fprintf("\nThe value of current:%0.3f A",I);
```

Sample Input

110
22000

Sample Output

The value of current:0.005 A

Result

Thus, Program "**Current**" has been successfully executed

Q. Cube and Sphere

A cube has a side of 18 cm. (a) Determine the radius of a sphere that has the same surface area as the cube. (b) Determine the radius of a sphere that has the same volume as the cube. Surface area of cube = $6a^2$ Surface area of Sphere (SA)= $4(\pi)r^2$ Radius of the sphere (r) = $\sqrt{(SA/4\pi)}$ Volume of cube = a^3 Volume of Sphere = $\frac{4}{3}(\pi)r^3$ Radius of sphere = $(3V/4\pi)^{1/3}$ The input format is Enter the side of the cube :

Source Code

```
a=input();
fprintf("\nPart A");
sa=6*(a^2);
fprintf("\nSA = %d",sa);
r= sqrt(sa/(4*pi));
fprintf("\nRadius = %.2f",r);
fprintf("\nPart B");

v=a^3;
r=nthroot(3*v/(4*pi), 3);

fprintf("\nRadius = %.2f",r);
```

Sample Input

6

Sample Output

Part A
SA = 216
Radius = 4.15
Part B
Radius = 3.72

Result

Thus, Program "Cube and Sphere" has been successfully executed

Q. Compounded interest

The balance B of a savings account after t years when a principal P is invested at an annual interest rate r and the interest is compounded yearly is given by: $B=P*(1+r/100)^n$. Suppose \$5,000 is invested for 17 years in one account where the interest is compounded yearly. The interest rate is 8.5%. Use MATLAB to determine the balance after 17 years. The input format is: Enter the Principal amount:Enter the Rate of interest(in %):Enter the no.of years:

Source Code

```
P=input("");
r=input("");
ta=input("");
B=P*(1+r/100)^ta;
fprintf("\nBalance=%0.2f", B);
```

Sample Input

```
5000
8.5
7
```

Sample Output

```
Balance=8850.71
```

Result

Thus, Program "**Compounded interest**" has been successfully executed

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MATHSLAB

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Q. Calculate

Define the variable x as 2.34, then evaluate: $2x^4 - 6x^3 + 14.8x^2 + 9.1$. The input value is Enter the value of x:

Source Code

```
x=input();
a=2*x^4-6*x^3+14.8*x^2+9.1;
fprintf("\nAns = %0.3f",a);
```

Sample Input

2.34

Sample Output

Ans = 73.226

Result

Thus, Program "**Calculate**" has been successfully executed

Q. String

Write a program which takes input as string and then implement the logic a. Reverse this string. b. Convert to all upper case c. Convert to all lower case
The input format is Enter Name:

Source Code

```
name=input("','s');  
fprintf("%s\n",fliplr(name));  
fprintf("%s\n",upper(name));  
fprintf("%s\n",lower(name));
```

Sample Input

Siva

Sample Output

```
aviS  
SIVA  
siva
```

Result

Thus, Program "**String**" has been successfully executed

Q. Matinee Movie Tickets

Write a program that determines the price of a movie ticket. The program asks for the customers age and for the time on a 24-hour clock (where noon is 12. 00 and 4 : 30PM is 16. 30). The show timings are 10. 15, 13. 30, 18. 00 and 22. 00. The normal adult ticket price is \$8. 00, however the adult matinee price is \$5. 00. Adults are those over 13 years. The normal childrens ticket price is \$4. 00, however the childrens matinee price is \$2.00. The input format is Enter your age:Enter the show timing :

Source Code

```
m=13.30;
a=input("");
b=input("");
if b==m
    if a<13
        fprintf('Ticket price is $2.00');
    else
        fprintf('Ticket price is $4.00');
    end
else
    if a<13
        fprintf('Ticket price is $5.00');
    else
        fprintf('Ticket price is $8.00');
    end
end
```

Sample Input

```
8
10.15
```

Sample Output

```
Ticket price is $5.00
```

Result

Thus, Program "**Matinee Movie Tickets**" has been successfully executed

Q. Hello

Print a welcome message multiple times in this function. The number of times the welcome message is printed depends on the number of characters in the name. The input format is Enter Name:

Source Code

```
name=input('s');
count=length(name);
for i=1:count
    fprintf('Welcome %s.\n',name);
end
```

Sample Input

Ram

Sample Output

Welcome Ram.
Welcome Ram.
Welcome Ram.

Result

Thus, Program "**Hello**" has been successfully executed

Q. FindMin

Find the minimum of the five numbers given as input using function. The input format Enter number 1:Enter number 2:Enter number 3:Enter number 4:Enter number 5:

Source Code

```
function min = mymin(n1,n2,n3,n4,n5)
min = n1;
if(n2 < min)
    min = n2;
end
if(n3 < min)
    min = n3;
end
if(n4 < min)
    min = n4;
end
if(n5 < min)
    min = n5;
end
end

x1=input("");
x2=input("");
x3=input("");
x4=input("");
x5=input("");
min1= mymin(x1,x2,x3,x4,x5);
fprintf("\nMin=%d",min1);
```

Sample Input

1
2
3
4
5

Sample Output

Min=1

Result

Thus, Program " **FindMin** " has been successfully executed

Q. FindMax

Find the maximum of the five numbers given as input using function. The input format is Enter number 1:Enter number 2:Enter number 3:Enter number 4:Enter number 5:

Source Code

```
function max = mymax(n1,n2,n3,n4,n5)
max = n1;
if(n2 > max)
    max = n2;
end
if(n3 > max)
    max = n3;
end
if(n4 > max)
    max = n4;
end
if(n5 > max)
    max = n5;
end
end

x1=input("");
x2=input("");
x3=input("");
x4=input("");
x5=input("");
max1= mymax(x1,x2,x3,x4,x5);
fprintf("\nMax=%d",max1);
```

Sample Input

1
2
3
4
5

Sample Output

Max=5

Result

Thus, Program "**FindMax**" has been successfully executed

Q. Factorial

You are asked to generate a program to get an input number (n) from the user and find the value $1*2*3*4*5*..n$. using For Loop. sample output would be Factorial of 5 is 120. the input format is Enter the Input Number :

Source Code

```
n=input("");
fact=1;
for i = 1:n
fact=fact*i;
end
fprintf("\nFactorial of %d is %d\n",n,fact);
```

Sample Input

5

Sample Output

Factorial of 5 is 120

Result

Thus, Program "**Factorial**" has been successfully executed

Q. Factorial

You are asked to generate a program to get an input number (n) from the user and find the value $1*2*3*4*5*..n$. using For Loop. sample output would be Factorial of 5 is 120. the input format is Enter the Input Number :

Source Code

```
n=input("");
fact=1;
for i = 1:n
fact=fact*i;
end
fprintf("\nFactorial of %d is %d\n",n,fact);
```

Sample Input

5

Sample Output

Factorial of 5 is 120

Result

Thus, Program "**Factorial**" has been successfully executed

Q. DIVISIBLE BY 3

Write a C program that prints "yes" if the given integer is divisible by 3 and "no" otherwise. The input format Enter the number :

Source Code

```
a=input();
if mod(a,3)==0;
fprintf("\nyes");
else
    fprintf("\nno");
end
```

Sample Input

24

Sample Output

yes

Result

Thus, Program "**DIVISIBLE BY 3**" has been successfully executed

Q. Cube and Sphere

A cube has a side of 18 cm. (a) Determine the radius of a sphere that has the same surface area as the cube. (b) Determine the radius of a sphere that has the same volume as the cube. Surface area of cube = $6a^2$ Surface area of Sphere (SA)= $4(\pi)r^2$ Radius of the sphere (r) = $\sqrt{SA/4\pi}$ Volume of cube = a^3 Volume of Sphere = $\frac{4}{3}(\pi)r^3$ Radius of sphere = $(3V/4\pi)^{1/3}$ The input format Enter the side of the cube :

Source Code

```
a=input();
fprintf("\nPart A");
sa=6*(a^2);
fprintf("\nSA = %d",sa);
r= sqrt(sa/(4*pi));
fprintf("\nRadius = %.2f",r);
fprintf("\nPart B");

v=a^3;
r=nthroot(3*v/(4*pi), 3);

fprintf("\nRadius = %.2f",r);
```

Sample Input

6

Sample Output

Part A
SA = 216
Radius = 4.15
Part B
Radius = 3.72

Result

Thus, Program "**Cube and Sphere**" has been successfully executed

Q. Calculator

Define the variable x as 2.34, then evaluate: $2x^4 - 6x^3 + 14.8x^2 + 9.1$. The input format is Enter the value of x:

Source Code

```
x=input();
a=2*x^4-6*x^3+14.8*x^2+9.1;
fprintf("\nAns = %0.3f",a);
```

Sample Input

2.34

Sample Output

Ans = 73.226

Result

Thus, Program "**Calculator**" has been successfully executed