# NAME-SHUBHOJYOTI ROY

# ROLL NO-21CE8036

SUBJECT CODE-CES651(COMPUTATIONAL LABORATORY)

1(i) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4]; C=A+B;

disp(C)

(ii) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4]; D=A-B;

disp(D)

(iii) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4]; P=A\*B;

disp(P)

(iv) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4]; Q=A\*B;

disp(Q)

(v) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4];

C=trace(A); disp(C)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (vi) A = [2 | -3 | 1; 2 | 6 | -8; 7 0 1]; |
| B = [1 2 0; | -1 | 1 2; | 3 | 1 4]; |

C=prod(A,"all"); disp(C)

(vii) A = [2 -3 1; 2 6 -8; 7 0 1];

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| B = [1 2 0; -1 1  C=prod(diag(B)); disp(C) | 2; | 3 | 1 | 4]; |
| (viii) A = [2 -3 | 1; | 2 | 6 | -8; 7 0 1]; |
| B = [1 2 0; -1 1  C=prod(diag(B)); disp(C) | 2; | 3 | 1 | 4]; |

|  |  |
| --- | --- |
| (ix) A = [2 -3 | 1; 2 6 -8; 7 0 1]; |
| B = [1 2 0; -1 | 1 2; 3 1 4]; |
| n=input("enter  C=B\*n\*B; | any no."); |

(x) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4];

C=B\*transpose(A); disp(C)

|  |  |  |
| --- | --- | --- |
| (xi) A = [2 -3 1; 2 | 6 | -8; 7 0 1]; |
| B = [1 2 0; -1 1 2; | 3 | 1 4]; |
| C=rank(B); |  |  |
| disp(C) |  |  |

(xii) A = [2 -3 1; 2 6 -8; 7 0 1];

B = [1 2 0; -1 1 2; 3 1 4];

C=eig(A); disp(C)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (xiii) A = [2 -3 | 1; | 2 | 6 | -8; 7 0 1]; |
| B = [1 2 0; -1 1  C=inv(B);  disp(C) | 2; | 3 | 1 | 4]; |

2(i)

Write a program for the summation of 12 integer numbers. sum=0;

for i=1:12 t=input('Enter number: '); sum=sum+t;

end

fprintf('Sum: %d\n', sum) OUTPUT:

|  |  |  |
| --- | --- | --- |
| Enter | number: | 1 |
| Enter | number: | 2 |
| Enter | number: | 3 |
| Enter | number: | 4 |
| Enter | number: | 5 |
| Enter | number: | 6 |
| Enter | number: | 7 |
| Enter | number: | 8 |
| Enter | number: | 9 |
| Enter | number: | 10 |
| Enter | number: | 11 |
| Enter | number: | 12 |
| SUM:78 |  |  |

1. Write a program for the summation of 1.5+3.2+4.1+7.9. sum\_real\_numbers = 1.5 + 3.2 + 4.1 + 7.9;

disp(['Sum of real numbers: ' num2str(sum\_real\_numbers)])

OUTPUT: 16.7

1. Write a program for multiplication of 7 real numbers. prod=1;

for i=1:7

t=input('Enter number: '); prod=prod\*t;

end

fprintf('Product: %d\n', prod); OUTPUT: Enter number: 1

|  |  |  |
| --- | --- | --- |
| Enter | number: | 2 |
| Enter | number: | 3 |
| Enter | number: | 4 |
| Enter | number: | 5 |
| Enter | number: | 6 |
| Enter | number: | 7 |

PROD=5040

1. Write a program for division of 2 integers. a=input("enter one number")

b=input("enter second number") c=a/b;

disp(c);

OUTPUT:1.5

1. Write a program to find out the remainder in the division of two numbers a=input("enter one number");

b=input("enter second number"); c=mod(a,b);

disp(c)

OUTPUT:3

1. Write a program to find out (x-y)3.

a=input("enter any number")

b=input("enter other number") c=(a+b)^3;

disp(c) OUTPUT:

enter any number 2 enter other number 3 C=125;

(vii) l= 3.1; m= -1.5; n= 3.14/2; x= 2/ 3.14; y= 3^(1/2);

a=(l^2)+m\*x; b=sin(n+(y/n));

c=1/(cos(n+log(x)));

d=(l+n)/(x+y);

e=(l+n)^3/m; fprintf('(l^2)+mx :%d \n',a);

fprintf('sin(n+(y/n)):%d\n',b);

fprintf('1/(cos(n+ln(x))) :%d\n',c);

fprintf('(l+n)/(x+y):%d\n',d);

fprintf('(l+n)^3/m:%d\n',e);

OUTPUT:- (l^2)+mx :8.654586e+00

# sin(n+(y/n)):4.514374e-01 1/(cos(n+ln(x))) :2.290162e+00 (l+n)/(x+y):1.971301e+00 (l+n)^3/m:-6.789838e+01

1. Write a program for the summation of first n integers: n is an input from user.

n=input("enter one number"); sum=0;

for a=1:n

sum=sum+a;

end disp(sum);

1. Write a program for summation of such integers in between 1 and 100 which are divisible by 5 and not divisible by 8: Use Loop and IF THEN-ELSE-ENDIF statement.

sum = 0;

for i = 1:100

if mod(i, 5) == 0 && mod(i, 8) ~= 0

end

end

sum = sum + i;

disp(['The summation of numbers between 1 and 100 that are divisible by 5 but not divisible by 8 is: ' num2str(sum)]);

OUTPUT:- 930

1. Write a program to calculate: 13+23+33+53+83+133+……. + up to nth term where n is

input (Use dynamic memory allocation). sum= 0;

n= input('enter the value of n:');

for i = 1:n

sum = sum + i^3;

end disp(sum)

OUTPUT:- enter the value of n:2 9

enter the value of n:4 100

1. Write a program that calculates the difference in volume between two cones. Use subroutine to calculate the volume.

r1=input('Enter radius 1: '); r2=input('Enter radius 2: '); diff=abs(calcVolume(r1)-calcVolume(r2)); fprintf('Difference: %d\n', diff); function v=calcVolume(r)

v=4/3\*pi\*r^3; end

OUTPUT:- Enter radius 1: 4

Enter radius 2: 5 Difference: 2.555162e+02 Enter radius 1: 6

Enter radius 2: 5 Difference: 3.811799e+02

3(i) Simply supported beam: Deflection at center and rotations at the ends. input('Enter the length of the beam (L): ');

UDL = input('Enter the uniformly distributed load (UDL): '); E = input('Enter the modulus of elasticity (E): ');

I = input('Enter the moment of inertia (I): ');

deflection\_center = (5 \* UDL \* L^4) / (384 \* E \* I); rotation\_end1 = (UDL \* L^3) / (16 \* E \* I); rotation\_end2 = -rotation\_end1;

disp(['Deflection at the center of the beam: ' num2str(deflection\_center)]); disp(['Rotation at end 1 of the beam: ' num2str(rotation\_end1)]); disp(['Rotation at end 2 of the beam: ' num2str(rotation\_end2)]);

OUTPUT:- Enter the length of the beam (L): 10 Enter the uniformly distributed load (UDL): 20 Enter the modulus of elasticity (E): 1

Enter the moment of inertia (I): 1

Deflection at the center of the beam: 2604.1667 Rotation at end 1 of the beam: 1250

Rotation at end 2 of the beam: -1250

Enter the length of the beam (L): 20

Enter the uniformly distributed load (UDL): 40 Enter the modulus of elasticity (E): 2

Enter the moment of inertia (I): 2

Deflection at the center of the beam: 20833.3333 Rotation at end 1 of the beam: 5000

Rotation at end 2 of the beam: -5000

1. Cantilever beam: Deflection as well as rotation at the center and at the free end.

L = input('Enter the length of the cantilever beam (L): ');

UDL = input('Enter the uniformly distributed load (UDL): '); E = input('Enter the modulus of elasticity (E): ');

I = input('Enter the moment of inertia (I): '); deflection\_center = (UDL \* L^4) / (8 \* E \* I); rotation\_center = (UDL \* L^3) / (6 \* E \* I); deflection\_free\_end = (UDL \* L^4) / (24 \* E \* I); rotation\_free\_end = (UDL \* L^3) / (6 \* E \* I); disp(['Deflection at the center of the cantilever beam: ' num2str(deflection\_center)]);

disp(['Rotation at the center of the cantilever beam: ' num2str(rotation\_center)]); disp(['Deflection at the free end of the cantilever beam: ' num2str(deflection\_free\_end)]);

disp(['Rotation at the free end of the cantilever beam: ' num2str(rotation\_free\_end)]);

OUTPUT:-

Enter the length of the cantilever beam (L): 10

Enter the uniformly distributed load (UDL): 20 Enter the modulus of elasticity (E): 2

Enter the moment of inertia (I): 2

Deflection at the center of the cantilever beam: 6250 Rotation at the center of the cantilever beam: 833.3333 Deflection at the free end of the cantilever beam: 2083.3333 Rotation at the free end of the cantilever beam: 833.3333

Enter the length of the cantilever beam (L): 20 Enter the uniformly distributed load (UDL): 10 Enter the modulus of elasticity (E): 1

Enter the moment of inertia (I): 1

Deflection at the center of the cantilever beam: 200000 Rotation at the center of the cantilever beam: 13333.3333 Deflection at the free end of the cantilever beam: 66666.6667 Rotation at the free end of the cantilever beam: 13333.3333

1. Fixed beam: Deflection as well as rotation at 0.25L and 0.75L from the left end.

L = input('Enter the length of the fixed beam (L): ');

UDL = input('Enter the uniformly distributed load (UDL): '); E = input('Enter the modulus of elasticity (E): ');

I = input('Enter the moment of inertia (I): '); deflection\_mid = (5 \* UDL \* L^4) / (384 \* E \* I); rotation\_025L = (UDL \* L^3) / (24 \* E \* I); rotation\_075L = rotation\_025L;

disp(['Deflection at the mid-span of the fixed beam: ' num2str(deflection\_mid)]); disp(['Rotation at 0.25L from the left end: ' num2str(rotation\_025L)]); disp(['Rotation at 0.75L from the left end: ' num2str(rotation\_075L)]);

OUTPUT:- Enter the length of the fixed beam (L): 10 Enter the uniformly distributed load (UDL): 10 Enter the modulus of elasticity (E): 1

Enter the moment of inertia (I): 1

Deflection at the mid-span of the fixed beam: 1302.0833

Rotation at 0.25L from the left end: 416.6667 Rotation at 0.75L from the left end: 416.6667

Enter the length of the fixed beam (L): 20 Enter the uniformly distributed load (UDL): 20 Enter the modulus of elasticity (E): 2

Enter the moment of inertia (I): 2

Deflection at the mid-span of the fixed beam: 10416.6667 Rotation at 0.25L from the left end: 1666.6667

Rotation at 0.75L from the left end: 1666.6667

1. Deflection and rotation at any location of a determinate beam. Geometry, material property, and boundary condition as well as the location(s) will be user input.

L = input('Enter the length of the beam (L): ');

UDL = input('Enter the uniformly distributed load (UDL): '); E = input('Enter the modulus of elasticity (E): ');

I = input('Enter the moment of inertia (I): ');

location = input('Enter the location along the beam (0 <= x <= L): '); if location < 0 || location > L

error('Invalid location. Please enter a value within the beam length.');

end

deflection\_location = (UDL \* location^2 \* (3\*L - location)) / (6 \* E \* I); rotation\_location = (UDL \* location \* (L - location)^2) / (2 \* E \* I); disp(['Deflection at location ' num2str(location) ': ' num2str(deflection\_location)]);

disp(['Rotation at location ' num2str(location) ': ' num2str(rotation\_location)]);

OUTPUT:- Enter the length of the beam (L): 10 Enter the uniformly distributed load (UDL): 10 Enter the modulus of elasticity (E): 1

Enter the moment of inertia (I): 1

Enter the location along the beam (0 <= x <= L): 5 Deflection at location 5: 1041.6667

Rotation at location 5: 625

Enter the length of the beam (L): 20

Enter the uniformly distributed load (UDL): 20 Enter the modulus of elasticity (E): 1

Enter the moment of inertia (I): 1

Enter the location along the beam (0 <= x <= L): 30