Sessional

CE 2202

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Unix-Linax-Operating System

Windose-Operating system বেশি use হয়।

ANSI - American National Standards Institute

Java, Javascript, Limbo, LPC,

Keywords: 47 টা keyword আছে।

; = end of statement

string type হলে আগনে & আসবেনা

int main ( ) বেশি use হবে।

* constant → variable এর মান change হবে না

Volatile → " " " " হবে।

Operator and Expressions

Operator: +, −, *, /, ++, −−, >>, >=, <=, etc.

Types: Unary operator, Binary operator

1. (+)
   $x_2 = +x_1$
   (used to indicate +ve value of any operand)
2. (−)
3. (++)
   incremental operator
   x++
   ++x
   (Add 1 to the value of operand)
4. x−−;
   −−x;
   - −−x; → prefix operator
   - x−−; → Postfix operator

Types (6)

Arithmetic, Relational, logical
(বেশি imp)

1. + → Addition
   (s=a+b;)
2. − → Substraction
   (s=a−b;)
3. * → Multiplication
   (s=a*b;)
4. / → Division
   (s=a/b;)
   (সাধারণত আমরা integer নেই)
5. % → Modulo Division (আমরা শুধু integer নিয়ে কাজ করব)
   (s=a%b;) (s=10%6=4) and (s=10.0%4.0) = not valid
6. () → Braces
   [s=(a+b)

Relational Operator

< → x<y → For less than

<= → x<=y ; " " " and equal to

>= → x>=y ; " greter than and equal to

> → x>y ; " " "

== → x==12 ;" equal to

!= → x!=10; " not equal to

Logical operator

|| (logical or) ⟶ if (x==y)||z

&& (logical and) ⟶ if(x&&y)

! (logical not) ⟶ if(x!y)

Assignment operator

= → y=x+6; For assigning values

+= → x+=5 ; Means x=x+5 (short hand writing)

-= ⟶ x-=5 ; Means x=x-5

/= ⟶ x/=5 ; " x=x/5

= ⟶ x=6 ; " x=x*6

%= → x%=7 ; " x=x%7 (शेषफल)

>>= → x>>=5; " x=x>>5

Important

Conditional Operator

Formal : expression 1 ? expression 2 : expression 3

If the condition is true, expression 1 is returned else expression 2 is returned.

Example: 12>8 ? a : b; // returns the value a, since 12 is greater than 8

10!=5 ? 4:3; // returns 4, since 10 not equal to 5.

```
/* Conditional operator */
#include <stdio.h>
#include<conio.h>
int main()
{
int a=10, b=11;
int c;
c=(a<b)?a:b;
printf("%d", c);
}
```

Expression: (Imp)

Algebric Expression	C Expression
$2x-3$	2*x-3
$xy/z\pi$	(x*y)/(z*π)
cosx; sinx; tanx	cos(x); sin(x); tan(x)
$\cos^{-1}x$; $\sin^{-1}x$; $\tan^{-1}x$;	acos(x); asin(x); atan(x)
Absolute of x	fabs(x)
e^x	exp(x)
log(x)	log(x)
$\log_{10}^{x}$	log10(x)
x^y	pow(x, y)
square root of x	sqrt(x)
x rounded up (2.87)	ceil(x) (3.00)
x rounded down (2.87)	floor(x) (2.00)

Control Statements:

Types : Conditional Control Statement ; Loop Control state.

* Conditional Control Statement
  i. if statement / simple if statemen
  ii. if...else statement
  iii. elseif statement / elseif ladder
  iv. switch statement

} imp

If Statement

Format:

```
if (condition)
{
Block 1;
}
Block 2; (not necessary)
```

Example:

```
/*A program to show grade*/
#include<stdio.h>
int main()
{
float mark;
printf("Enter your marks \n");
scanf("%f", &mark);
    if(mark >=80)
    {
     printf("\n Your grade is A+");
    }
    printf("\n Your gradde is not
return(0);
}
```

Block — True

If...else statement (nested হওয়ার ন সংখ্যক condition judge করবার ক্ষেত্রে)

Format:

```
if (condition)
{
 Block 1;
}
else
{
 Block 2;
}
Block 3; (not necessary)
```

True — Block 1; False — Block 2;

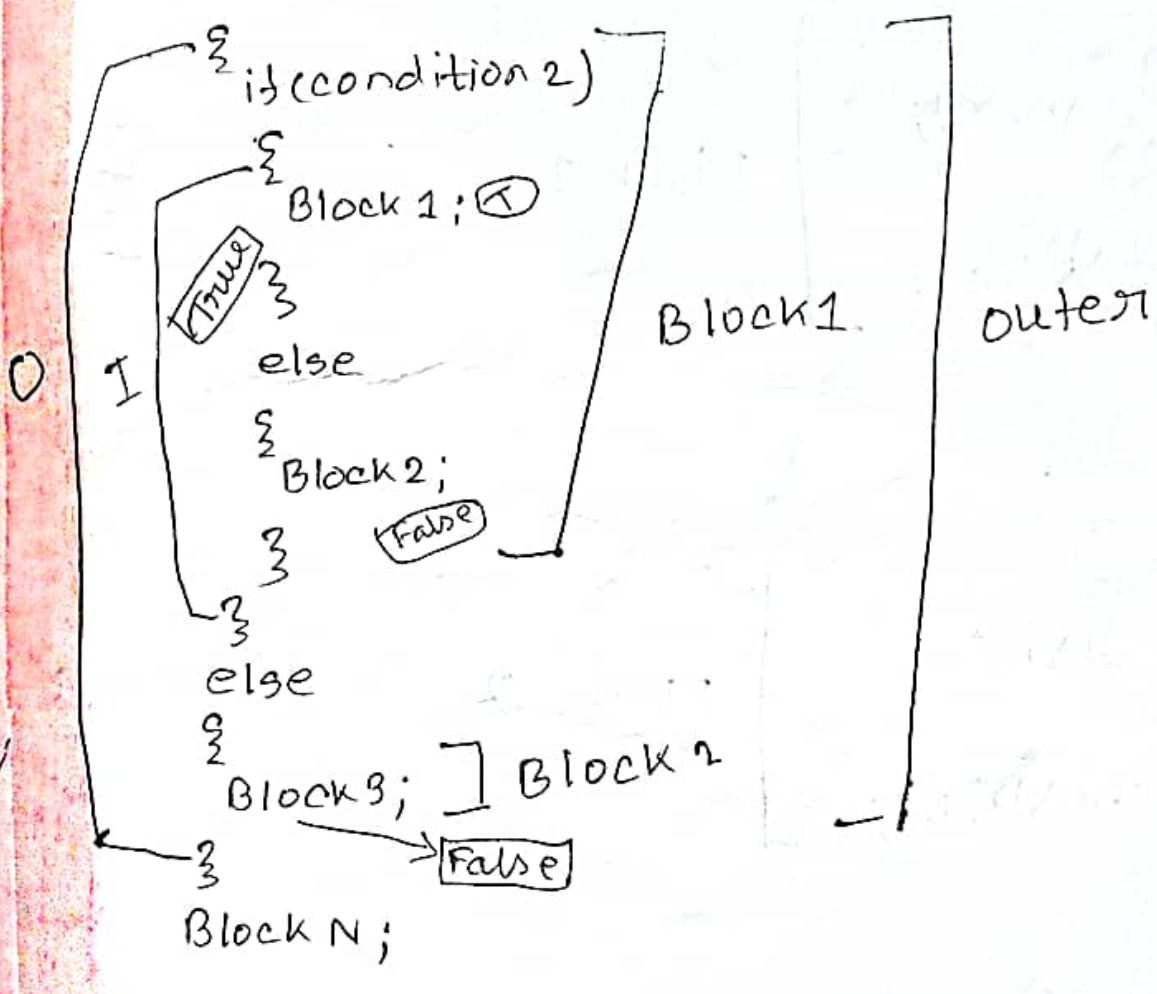
Example:

```
/*A program to show the status of stude
#includ<stdio.h>
float main()
{
float mark;
print f("Enter Marks : \n");
scanf("%f", &mark);
  if(mark >= 40)
```

```
{ printf("\n You have passed.\n");
  printf("\n congratulation!\n");
else
{ printf("\n You have failed.\n");
  printf("\n Good luck in the re-sit\n");
}
```

Nested if..... else statement

Format : if (condition 1)



Example:

```
/* A program to find the smallest number */
#include<stdio.h>
int main()
{
int a, b, c, ~~small~~;
printf("Enter a,b,c \n");
scanf("%d %d %d,"&a,&b,&c);
  if(a<b)
   {
    if(a<c)
     printf ("%d \n,"a);
     else
     printf("%d \n", c);
   }
 else
   {
    if(c<b)
     printf ("%d \n,"c);
      else
      printf ("%d \n", b);
   }
}
```

Block 1

Block 2

13.04.21

Loop Control Statement in C

- for statement (imp)
- while statement
- do..... while statement
- continue statement
- goto statement

for statement:

*Formad:

```
for (counter initialization; testcondition; counter increment/
                                              decrement )
{
Body of loop;
}
```

*Example:

/* Sum of series: 1+2+3+.... + N*/

```
#include <stdio.h>
int main( )
{
int i, n, sum;
printf("Enter the value of n: \n");
scanf ("%d", &n);
sum=0;
for(i=0; i<=n; i++)
{
sum=sum+i;
}
```

N = 10

1+2+3+4+5 ... +10 = ?

[i++ = i+1
  i-- = i-1]

```
printf("1+2+3+...+N = %d", sum);
return(0);
}
```

* for(i=0; i<=n; i++)
{
sum=sum+i;
printf("for %d-th loop, sum= %d\n", i, sum);
}

* প্রথম loop ("0th loop) এ 1 যোগ হয় না

* for(.....)
{
sum =
printf( )
}
printf("=========");
printf("\n 1+2+3+...+N = %d\n", sum);
return(0);
}

* /* Sum of series: 1+2+4+5+6+...+N */

for(i=0; i<=n; i++)
{
~~if(i==3~~
if(i !=3)
sum =
printf
}

//sum of series: 1+2+4+5+6.... N/

// Find the odd number in the series

```
#include<stdio.h>
int main()
{
int i,n, cn,sum;
printf("Enter the value of n: \n");
scanf("%d",&n);
sum=0;
cn=0;
for(i=0;i<=n;i++)
{
  if(i!=3)
  {
   if(i%2==1)
   cn=cn+1;
   sum=sum+i;
  }
  printf ("for %dth loop, sum=%d \n", i,sum);
}
printf("= = = = = = = = = =");
printf("\n 1+2+3+4+5+.... N=%d\n", sum);
printf("cn=%d", cn);
return(0);
}
```

// sum ---

// odd & even no. --

Nested if

* 1*2*3 .... N পর্যন্ত 2 টি বিষয়

* $\frac{1}{1!} + \frac{2}{2} + \cdots + \frac{N}{N}$ পর্যন্ত 1 টি বিষয়

```
/* sum
   // odd & even

#include <stdio.h>
int main()
{
 int n, i, cn, cnn, sum;
 printf("Enter the value of n: ");
 scanf("%d", &n);
 sum=0;
 cn=0;
 cnn=0;
 for(i=1, i<=n, i++)
 {
   if(i!=3)
    {sum=sum+i;
     if(i%2==1)
     cn=cn+1;
     if(i%2==0)
     cnn=cnn+1;
    }
   printf("Sum of the series: %d\n", sum);
 }
printf("=======\n");
printf("Sum of the series: %d\n", sum);
Printf("Number of odd numbers: %d\n", cn);
printf("      "    "  even    "      : %d\n", cnn);
return(0);
}
```

[i=0 ধরলে if(i%2==0) সংখ্যা cnn=cnn+1; for এর বাইরে লিখলে সঠিক ans আসবে]

[else cnn=cnn+1;]

E: Nested for statement

22.4.21

```
for(counter initialization; test condition; counter incre/decre)
{
  for(ini; condition; incre/decre)
  {
    for(ini; condition; incre/decre)
    {
      body of inner most loop;
    }
    body of inner loop;
  }
  body of outer loop;
}
```

Example:

```
#include<stdio.h>
main int main()
{
int i, j, k, s;
printf("Enter the value of n: \n");
scanf("%d", &n);
s=0;
for(i=0; i<=n; i++)
{
  for(j=0; j<=n; j++)
  {
    for(k=0; k<=n; k++)
    {
      sum=k;
    }
    sum=sum+j;
  }
  sum=sum+i;
}
```

i=0
j=0 — n=2
k=0
sum=0 — n=2
k=1
s=1
k=2
s=2

j=0
j=1 : j=2
k=0 | k=0
k=1 | k=1
k=2 | k=2

i=0

While statement:

format:

```
counter initialization
while(condition)
{
Body of loop;
Counter incre/decrement;
}
```

Example:

```
/* Sum of series: 1+2+3+....N */
#include <stdio.h>
int main()
{
int i,n,sum;
printf("Enter the value of n: \n");
scanf("%d",&n);
i=0;
sum=0;
{
sum=sum+i; (body)
i=i+1;
}
printf("1+2+3+....+N=%d",sum);
return(0);
}
```

Nested while: (video)

do.... while statement

Format:

```
Counter initialization;
do
{
Body of loop;
Counter & incre/decre;
}
while(test condition);
```

Example:

```
#include <stdio.h>
main()
int i=10;
do
{printf("Hello %d\n",i);
 i=i-1;
}
while (i>0);
```

- Continue Statement;

```
continue;
```

Example:

- goto statement;

else if statement

formal:

```
if (condition-1)
{
Block 1;
}
else if (condition-2)
{
Block 2;
}
....
....
else
{
Default block;
}
Block-N;
```

* N সংখ্যক condition

True, N সংখ্যক

False 1 টি (Block-N;)

Example:

```
#include <stdio.h>
float main()
{
float mark;
printf("Enter Marks
        obtained: \n");
Scanf("%f", &mark);
if(mark>=80)
 printf("Your Grade in A+\n");
 else if(mark>=75)
 printf("Your Grade is A\n");
 ....
 ....
 ....
 else if(mark>=40)
printf("Ur Grade is D\n");
else
printf("Sorry u have
        failed\n");
```

---

* Write a program to find the root of a quadratic equation $ax^2+bx+c=0$

* A code to reverse a three digit number

Example: Input 123, Output = 321

* Program to Make a simple calculator to Add, Substract, Multiply or divide

(বাকি)

Important

28.09.21

Array (1D, 2D)

- Definition:

An array is a group of data items that share a common name.

Used to handle similar type of data

- Types:

One dimensional array, Multi dimensional array

- One dimensional Array

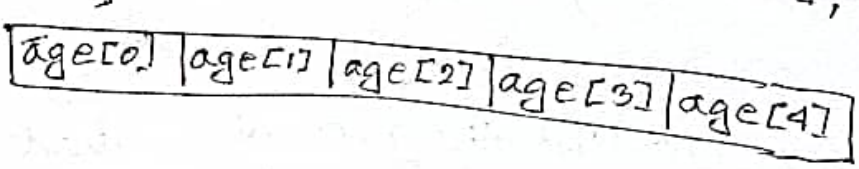
Format:

Data Type Array Name [Array Size];

A[0] → A[0] ... A[9] [এভাবে নিয়ে- সব ব্যবহার করে]

* DataType ⇒ Any built in data type
* Array Name ⇒ A valid name of array variable
*

- Example: int age[5], moment[5], class[120];



Note that

[বাকি]

Initialization of one-dimensional array

int age[5] = {2,4,33,3,4};

age[0] = 2 ; age[3] = 3

It is not necessary to define the size of arrays during initialization.

int age[] = {2, 4, 33, 3, 4}

In this case, the compiler determines the size of array

balance

Reading and writing 1D array

```
#include<stdio.h>
int main()
{
int n[5], i;
for(i=0; i<5; i++)
{
scanf("%d", &n[i]); //read data to array
}
//
for(i=0; i<5; i++) ////print data to screen
{
printf("Number: %d is: %d\n", i, n[i]);
}
}
```

i=0 n[0]
i=1 n[1]
i=2 n[2]

* int এর declaration
এ n[5]=5 টি stage
* ইনডেক্সের মধ্যে n[4] এর value

* কে সবচেয়ে বড় (w.r.t)

* Stage ~~marks~~ মান দেয়ার সময় ধরবো। (CW.2)
* large এর সাথে average (CW.3 → problem)
* কতগুলো No আসবে যার avg এর চেয়ে বড় (10 টি value দিয়ে run করিয়ে assignment) (CW.4)

incomplete

2.5.21

Multi Dimensional Array

Format:

Data type Array Name [Array size 1] [Array size 2] .... [Array size N]

- Data type => Any built in data type
- Array Name => A valid name of array variable given by user
- Array size => A constant, full number.

Example: int a[3][3].

Dimention এর size এর difference

2D Array ~~matrix~~ matrix বিষয়ক (row × column)

Example: ~~shear~~ int shear[2][2], moment [3 (row)][2 (column)]; P[3]

⇒ * please create 2.2 = 4 space in the memory

* shear[0][0] shear[0][1]
  shear[1][0] shear[1][1]

* m[0][0] m[0][1]
  m[1][0] m[1][1]
  m[2][0] m[2][1]

* p[0]
  p[1]
  p[2]

program to write and read 2D array (6)

```
#include <stdio.h>
int main()
{
  int n[3][3], i, j; printf ("Enter the values of matrics \n");
//reading a 2D matrix/Array
  for(i=0 ; i<3; i++)  // first for loop
  {
  for (j=0; j<3; j++) // second for loop-nested for
  {
  scanf ("%d", &n[i][j]); // body of nested for
  }
  }
//writing a 2D matrix/Array
  for(i=0;i<3; i++) // first for loop
  {
    for(j=0; j<3; j++) // second for loop-nested for
    {
      printf ("%d", A[i][j]); // body of nested for
    } printf("\n");
  }
  return(0);
}
```

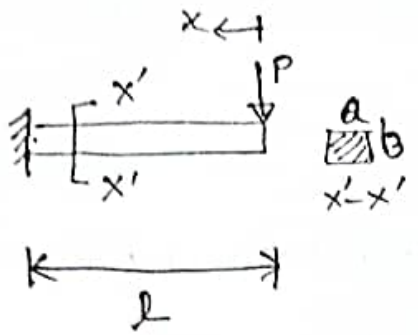
* দুইটা matrix read and line (6.1)
* ৩টা matrix যোগ করে C (6.2)

1. A matrix + B matrix = C হবে (6.3)
{diagonal (সারসরি) করে

2. [redacted]

22.06.21

P-1



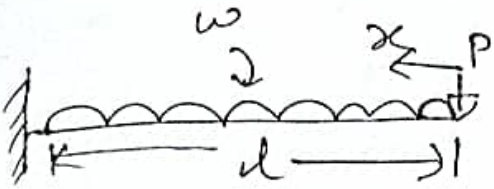
x=0,
Load applied

| shear, V
at every l/10 distance
ii) Moment, M at every l/10 distance from the point load

```
//* * * * * (problem নিম্নরে 27a
#include<stdio.h>
void main ()
{
  float l,p,v,m,x
printf scanf (" Enter l, p\n");
  scanf ("%f%f", &l,&p);
  for (x=0; x<=l; x=x+l/10)
                    x+0.1*l)
  { if(x==0){v=0; m=0;} else {
    v=-p;
    m=-p*x;}      at%f"
  }printf("Shear, V= %f", v,x);
   printf("Moment, m at %f = %f", x, m);
}
```

project_jun 22a.cpp

P-2



V = ?

m = ?

P = 1 K

l = 10'

w = 1 K/ft

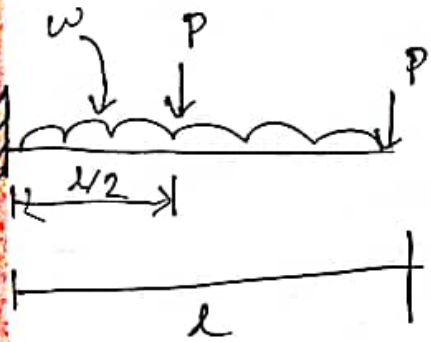
V = -P - ωx

m = -Px - $\frac{\omega x^2}{2}$

d.cpp

H.W

P-3



V = ?

m = ?

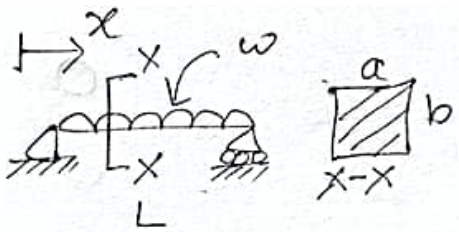
P = 1 K

l = 10'

w = 1 K/ft

V = -P -

1.

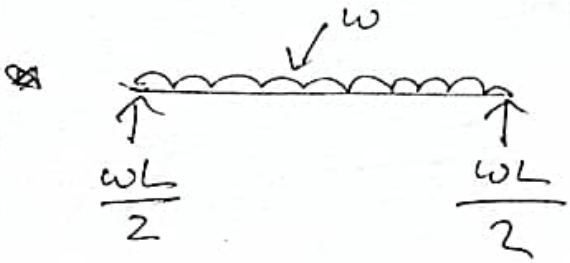


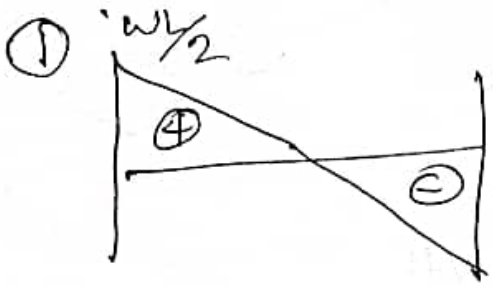
i) V_{max}

ii) S_s (shearing stress) $= \frac{VQ}{IB}$ } at every $L/10$

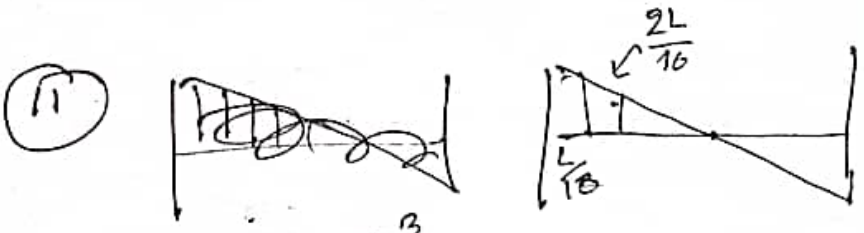
iii) $\sigma_s = \frac{Mc}{I}$

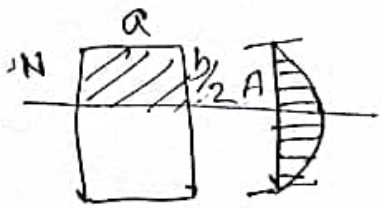
$L = 10'$; $a = 1'$; $b = 1'$; $w = 1\ kip/ft$



① 

① $V_{max} = \frac{wL}{2}$

(11) 



$I = \frac{ab^3}{12}$

$B = a$

$Q = \frac{ab^2}{8}$

$V_1 = \frac{wL}{2} - w \times \frac{L}{10} \times i$

Q = First moment of inertia

$Q = a \times \frac{b}{2} \times \frac{b}{4}$

$= \frac{ab^2}{8}$

$i = 1, 3, 7, \ldots$

$\frac{2L}{10}, \frac{3L}{10}, \frac{7L}{10}$

(1) $V_0 = \frac{wL}{2}$

$V_1 = \frac{wL}{2} - \frac{L}{10} \times w$

$V_i = \frac{wL}{2} - \frac{wL}{10} i$

* for($x=0$; $x \le L$; $x = x + \frac{L}{10}$)

* void main ( )

{

float v, x, L, a, b, w, SS[11], q, i;

for ($x=0$; $x \le L$; $x = x + \frac{L}{10}$)

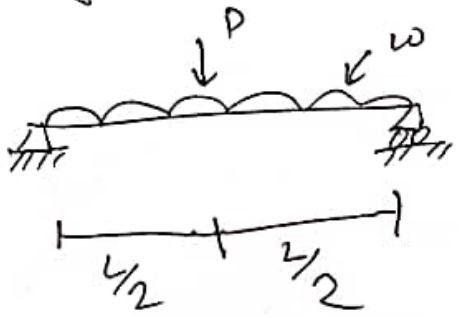
{

V[x] = (w * L/2.0) - (w * L * x/10.0);

SS[x]

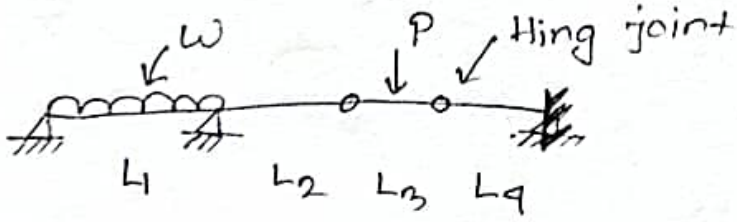
}

* Assignment - 5



06.07.2021

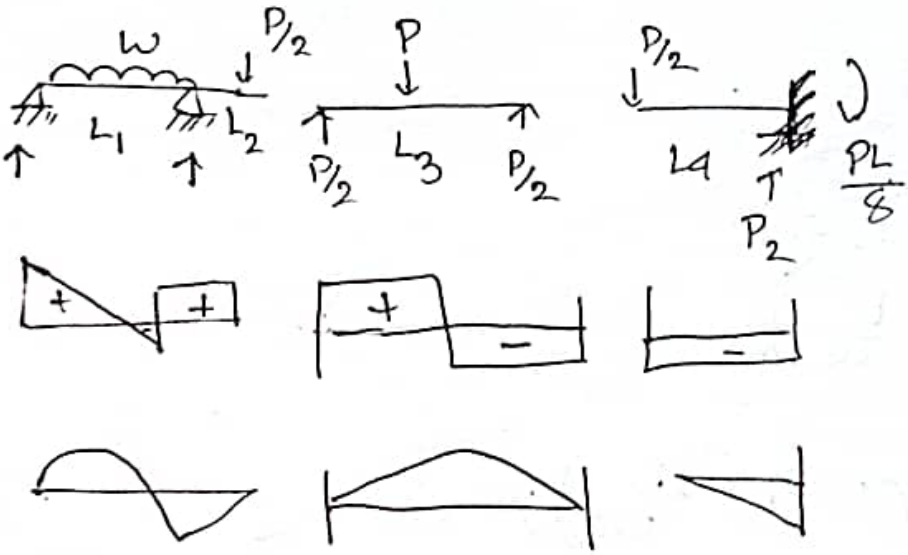
P-1:



Load P is applied at the middle of L_3.

(i) Compute Vmax

(ii) Compute Mmax



Input:

$w = 1\ k/ft$

$P = 1\ kip$

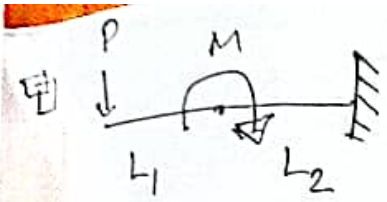
$L_1 = 10\ ft$

$L_2 = 5\ ft$

$L_3 = 6\ ft$

$L_4 = 10\ ft$

*Support a share পেলে খুশি



P = 1k

M = 10k-ft

L_1 = 20 ft

L_2 = 10 ft

V, M at every $L_1/10$ and $L_2/10$ dist

nxt class quiz, xm

6. internal hinge বাদ হবে পারে (5m বাদ) (15/10 marks) quiz and program