

Basic Fundamental Programming

Day 3: May 2021

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```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
May21 LB Notes.bt x Array.java x
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20
21 System.out.println("-----")
22 for(int x:a1)
23 {
24     System.out.print(x+" ");
25 }
26
27 //-----
28 for(int i=0;i<a1.length;i++)
29 {
30
31 }
32
33
34 }
35 }
```

The diagram illustrates the logic of the provided Java code. At the top, a horizontal rectangle represents an array, divided into five equal segments by vertical lines. Below this, the text 'sum=0' is written in green. Below that, four lines of green code are shown: 'sum=sum+a[0];', 'sum=sum+a[1];', 'sum=sum+a[2];', and 'sum=sum+a[3];'. A yellow arrow points from the first segment of the array to the 'a[0]' in the first line of code. Another yellow arrow points from the second segment to the 'a[1]' in the second line. A third yellow arrow points from the third segment to the 'a[2]' in the third line. A fourth yellow arrow points from the fourth segment to the 'a[3]' in the fourth line. The fifth segment of the array is not connected to any line of code. The word 'sum' is also written in green below the third line of code, and the word 'umm' is written in green below the fourth line of code. The word 'sum' is also written in green below the fifth line of code, and it is enclosed in a yellow box.

Java source file length : 535 lines : 35 Ln : 33 Col : 1 Pos : 530 Windows (CR LF) UTF-8 INS

Exception in thread "main" java.lang.Array
at Array.main(Array.java:12)

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May21 LB Notes.bt Array.java

32 }
33 System.out.println("Sum= "+sum);
34
35 //-----
36 }
37 }

a1,a2

max/min = 5 8 9

equals()

a[0] > a[1]
a[0] < a[1]

max= a[0] ✓

else

max=a[1]

Java source file length : 638 lines : 37 Ln : 37 Col : 2 Pos : 639 Windows (CR LF) UTF-8 INS

File Edit

Max= 88

May21

29 C:\Test>javac Array.java

30 C:\Test>java Array

31 Enter Element[0]:

32 1

33 Enter Element[1]:

34 6

35 Enter Element[2]:

36 8

37 Enter Element[3]:

38 4

39 Enter Element[4]:

40 3

41 -----

42 1 6 8 4 3 Sum= 22

43 Max= 6

44 Max= 8

45 Max= 8

Max= 8

Max1= 8

C:\Test>

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max max max

1	6	8	4	3
---	---	---	---	---

max=~~1~~ / ~~6~~ / 8

Java source file length : 798 lines : 45 Ln : 43 Col : 29 Pos : 784 Windows (CR LF) UTF-8 INS

File Edit

Max= 88

May21

29 C:\Test>javac Array.java

30 C:\Test>java Array

31 Enter Element[0]:

32 1

33 Enter Element[1]:

34 6

35 Enter Element[2]:

36 8

37 Enter Element[3]:

38 4

39 Enter Element[4]:

40 3

41 -----

42 1 6 8 4 3 Sum= 22

43 Max= 6

44 Max= 8

45 Max= 8

Max= 8

Max1= 8

C:\Test>

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Who can see what you share here? Recording On

max max max

1	6	8	4	3
---	---	---	---	---

max=~~1~~ / ~~6~~ / 8

Java source file length : 798 lines : 45 Ln : 43 Col : 29 Pos : 784 Windows (CR LF) UTF-8 INS

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May21 LB Notes.txt Array1.java

532 `[[[]], [[[]], [[[]], [[[]], ...`

533

534 **Array of arrays**

535 2-D Array:

536 Syntax:

537 `<data type><array name>[][] = new <data type>[Rows][Cols];`

538 Ex:

539 `int a1[][]=new int[2][3];`

Diagram illustrating the memory structure of a 2D array:

- A variable `a1` points to a memory block containing pointers to the rows: `a[3][2]`, `b[3][3]`, and `c[2][[]]`.
- The memory block also contains addresses: `a100`, `b200`, and `c300`.
- Row 1 (labeled `c1`, `c2`, `c3`) is a 1x3 array.
- Row 2 (labeled `c1`, `c2`, `c3`) is a 1x3 array.
- The entire structure is labeled `2X3`.
- Each row is represented by a horizontal array of pointers (yellow boxes) pointing to the actual data elements (green boxes).

Normal text file length : 9,249 lines : 539 Ln : 539 Col : 26 Pos : 9,250 Windows (CR LF) UTF-8 INS

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May21 LB Notes.txt Array1.java

532 `[[[]], [[[]], [[[]], [[[]], ...`

533

534 **Array of arrays**

535 2-D Array:

536 Syntax:

537 `<data type><array name>[][] = new <data type>[Rows][Cols];`

538 Ex:

539 `int a1[][]=new int[2][3];`

c1 c2 c3

Row 1

Row 2

2X3

Normal text file length : 9,249 lines : 539 Ln : 539 Col : 26 Pos : 9,250 Windows (CR LF) UTF-8 INS

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

May21 LB Notes.txt x Array2.java x

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```
25 }
26 System.out.println();
27 }
28
29 //Printing 2D array: Method 2
30 for(int x[]:a1)//Rows:
31 {
32     for(int y:x)//col
33     {
34         System.out.println(y);
35     }
36 }
37 }
38
39
40 }
41 }
```

1 2
3 4

col wise printing

Row wise printing

Java source file length : 619 lines : 41 Ln : 41 Col : 2 Pos : 620 Windows (CR LF) UTF-8 INS

C:\Test>

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

May21 LB Notes.txt x Array2.java x

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Who can see what you share here? Recording C

```
25 }
26 System.out.println();
27 }
28
29 //Printing 2D array: Method 2
30 for(int x[]:a1)//Rows:
31 {
32     for(int y:x)//col
33     {
34         System.out.println(y);
35     }
36 }
37 }
38 }
39
40 }
41 }
```

1 2
3 4

col wise printing

Row wise printing

Java source file length : 619 lines : 41 Ln : 41 Col : 2 Pos : 620 Windows (CR LF) UTF-8 INS

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
May21 LB Notes.txt Array2.java
22 for(int j=0;j<a1[i]
23 {
24     System.out.print(a1[i][j]+" ");
25 }
26 System.out.println();
27 }
28 */
29 //Printing 2D array: Method 2
30 for(int x[]:a1)//Rows:
31 {
32     for(int y:x)//col
33     {
34         System.out.print(y);
35     }
36     System.out.println();
37 }
38 }
39 }
40 }
41 }
42 }
```

Who can see what you share here? Recording

1	2
3	4

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May21 LB Notes.txt Array2.java

```
7 Scanner sc = new Scanner(System.in);
8 int a1[][]=new int[2][2];
9
10 //Input ti 2D array
11 for(int i=0;i<a1.length;i++)//Row
12 {
13     for(int j=0;j<a1[i].length;j++)//Cols
14     {
15         a1[i][j]= sc.nextInt();
16     }
17 }
18 //Addition:
19
20 for(int i=0;i<a1.length;i++)//Row
21 {
22     for(int j=0;j<a1[i].length;j++)//Cols
23     {
24         c[i][j]=a[i][j]+b[i][j];
25         System.out.print(c[i][j]+" ");
26     }
27     System.out.println();
28 }
29
30 //Printing 2D array: Method 2
```

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M1 $a[i][j]$

M2 $b[i][j]$

M3 $c[i][j]$

Addition Logic

Java source file length : 665 lines : 43 Ln : 27 Col : 30 Pos : 494 Windows (CR LF) UTF-8 INS

```
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May21 LB Notes.txt Array2.java
Scanner sc = new Scanner(System.in);
int a1[][]=new int[2][2];

//Input ti 2D array
for(int i=0;i<a1.length;i++)//Row
{
    for(int j=0;j<a1[i].length;j++)//Cols
    {
        a1[i][j]= sc.nextInt();
    }
}

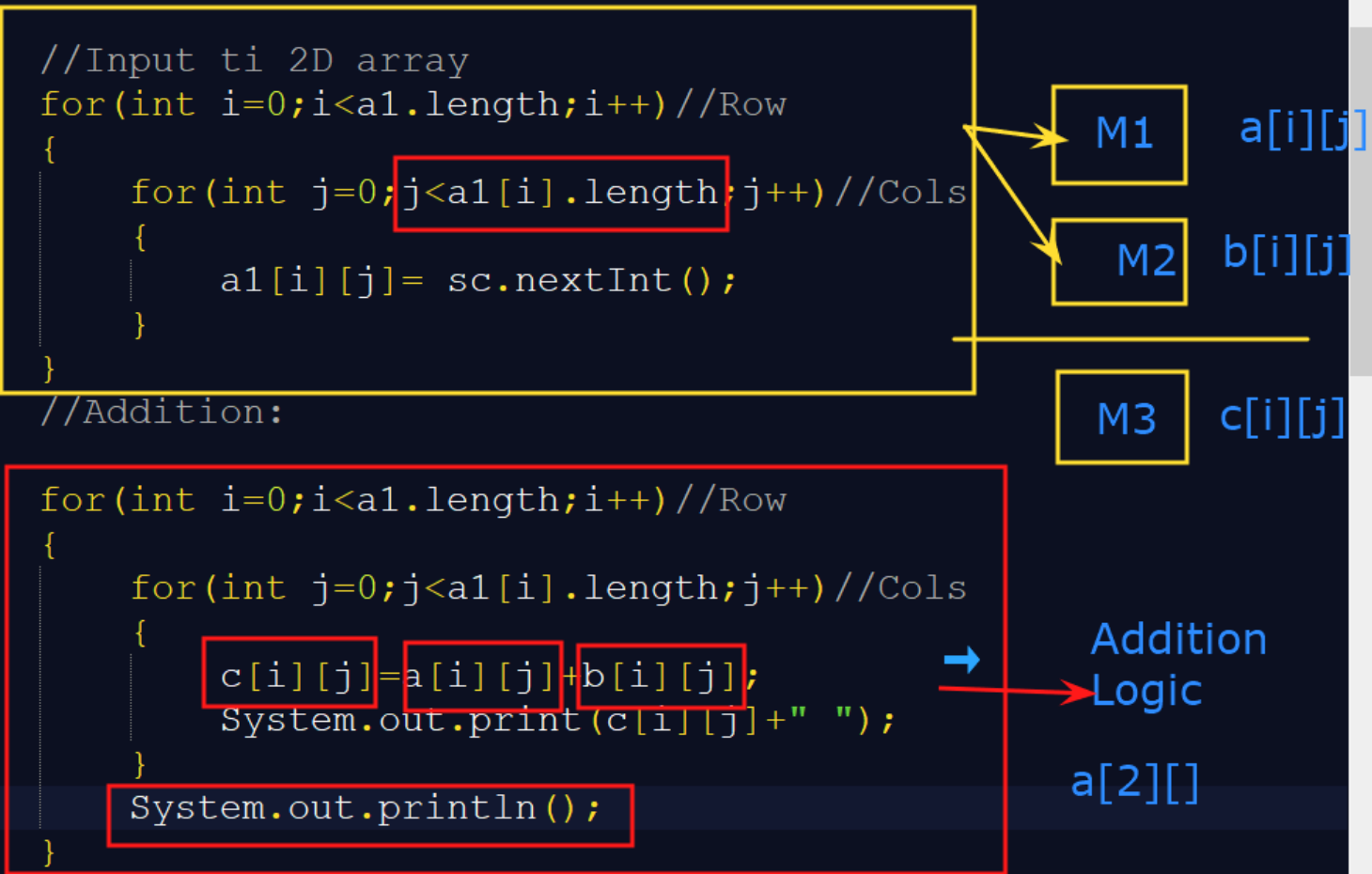
//Addition:

for(int i=0;i<a1.length;i++)//Row
{
    for(int j=0;j<a1[i].length;j++)//Cols
    {
        c[i][j]=a[i][j]+b[i][j];
        System.out.print(c[i][j]+" ");
    }
    System.out.println();
}

//Printing 2D array: Method 2
```

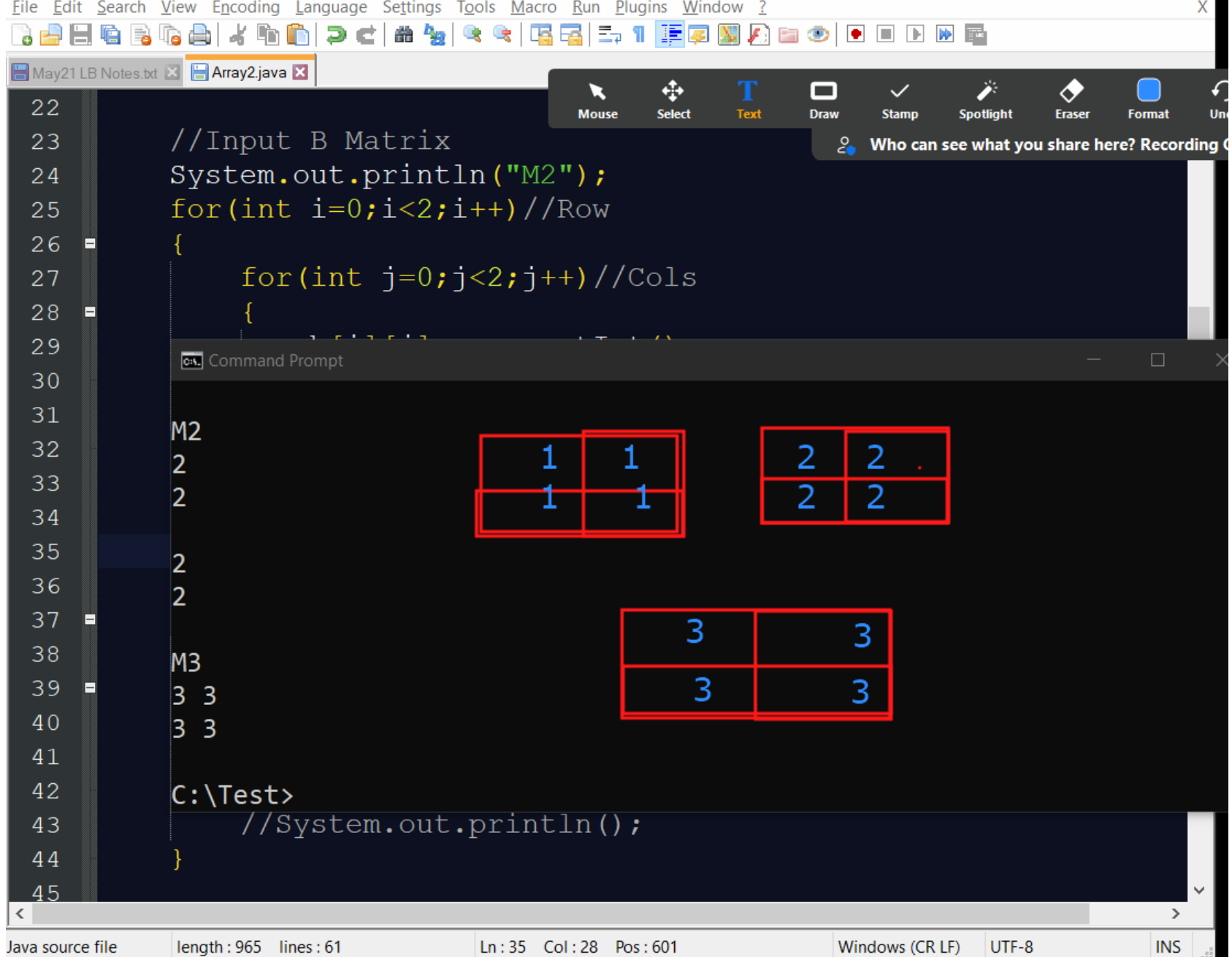
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```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
May21 LB Notes.txt Array2.java
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Who can see what you share here? Recording On

22 //Input B Matrix
23 System.out.println("M2");
24 for(int i=0;i<2;i++)//Row
25 {
26     for(int j=0;j<2;j++)//Cols
27     {
28         //Print the matrix
29         //Print the matrix
30
31 M2
32 2 1 1
33 2 1 1
34
35 2
36 2
37
38 M3
39 3 3
40 3 3
41
42 C:\Test>
43 //System.out.println();
44 }
45
```



```
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May21 LB Notes.txt Array2.java
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22
23 //Input B Matrix
24 System.out.println("M2");
25 for(int i=0;i<2;i++)//Row
26 {
27     for(int j=0;j<2;j++)//Cols
28     {
29
30
31
32 M2
33 2
34 2
35
36 2
37 2
38 M3
39 3 3
40 3 3
41
42 C:\Test>
43 //System.out.println();
44 }
45
```

Diagram illustrating matrix addition:

$$\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} + \begin{bmatrix} 3 & 3 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 5 & 5 \\ 5 & 5 \end{bmatrix}$$

Command Prompt output:

```
C:\Test>
//System.out.println();
}
```

Java source file length : 965 lines : 61 Ln : 35 Col : 28 Pos : 601 Windows (CR LF) UTF-8 INS

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May21 LB Notes.txt Array2.java

545
546
547
548 public class Student
549 {
550 //class body: variables, methods
551 }

class Dog

+String breed;
+String color;
+int age;

-barking();
-eating();

class car

+ String color;
+ String model;
+ float speed;

- driving();
-breaksystem();

solar system

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Normal text file length : 9,492 lines : 551 Ln : 547 Col : 1 Pos : 9,431 Windows (CR LF) UTF-8 INS