

# Lec 27

25/02/2023

for loop (Nested):

Rows  $\rightarrow i$  (Outer loop)

Cols  $\rightarrow j$  (Inner loop)

int i, j;

for(i=1; i<=4; i++)

{

① for(j=1; j<=4; j++)

{  
    Sep("A");  
}

② Sepln();

}

i = X Z 3 4 5

j = X Z 3 4 5  
X Z 3 4 5  
X Z 3 4 5  
X Z 3 4 5

|   |   | j |   |   |   |
|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 |
| i | 1 | A | A | A | A |
|   | 2 | A | A | A | A |
|   | 3 | A | A | A | A |
|   | 4 | A | A | A | A |

②

|   |   | j |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 | 6 |
| i | 1 | A | A | A | A | A | A |
|   | 2 | A | A | A | A | A | A |

3

|   |   | j |   |   |   |   |
|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 |
| i | 1 | * | * | * | * | * |
|   | 2 | * |   |   |   | * |
|   | 3 | * |   |   |   | * |
|   | 4 | * |   |   |   | * |
|   | 5 | * | * | * | * | * |

$i=1, j=1,2,3,4,5 \Rightarrow *$

$i=5, j=1,2,3,4,5 \Rightarrow *$

$j=1, i=1,2,3,4,5 \Rightarrow *$

$j=5, i=1,2,3,4,5 \Rightarrow *$

for (i=1; i<=5; i++)

{ for (j=1; j<=5; j++)

{ if (i==1 || i==5 || j==1 || j==5)  
    cout << " \* ";  
    else  
        cout << " ";  
}

}

cout << endl;

}

4

|   |               | j ≤ i   |  |
|---|---------------|---------|--|
| i | j             | # stars |  |
| 1 | 1             | 1       |  |
| 2 | 1, 2          | 2       |  |
| 3 | 1, 2, 3       | 3       |  |
| 4 | 1, 2, 3, 4    | 4       |  |
| 5 | 1, 2, 3, 4, 5 | 5       |  |

|   |   | j |   |   |   |   |
|---|---|---|---|---|---|---|
|   |   | 1 | 2 | 3 | 4 | 5 |
| i | 1 | * |   |   |   |   |
|   | 2 | * | * |   |   |   |
|   | 3 | * | * | * |   |   |
|   | 4 | * | * | * | * |   |
|   | 5 | * | * | * | * | * |

⑤

j  
↓  
1

2

3

4

5

|       |   |   |   |   |   |
|-------|---|---|---|---|---|
| i → 1 |   |   |   |   | * |
| 2     |   |   |   | * | * |
| 3     |   |   | * | * | * |
| 4     |   | * | * | * | * |
| 5     | * | * | * | * | * |

$j \leq (5-i)$

$j \leq i$

i

#spaces

#stars

1

4

1

2

3

2

3

2

3

4

1

4

5

0

5

for(i=1; i<=5; i++)

{

① for(j=1; j<=(5-i); j++)

  Sop("  ");

② for(j=1; j<=i; j++)

  Sop("\*  ");

③ Sop("\n")

}

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Language Java

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25 Feb 2023 - Nested for loops

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Main.java

```
110 import java.util.Scanner;
111 public class Main
112 {
113     public static void main(String[] args)
114     {
115         int i,j;
116         for(i = 1; i<=5; i++)
117         {
118             ① for(j=1;j<=(5-i);j++) // Loop for printing spaces
119             {
120                 System.out.print("D ");
121             }
122             ② for(j=1;j<=i;j++) // loop for printing *
123             {
124                 System.out.print("* ");
125             }
126             ③ System.out.println(); // going to new line
127         }
128     }
129 }
130
```

|   |   |   |   |   |   |
|---|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 | 5 |
| 1 | D | D | D | D | * |
| 2 | D | D | D | * | * |
| 3 |   |   |   |   |   |
| 4 |   |   |   |   |   |
| 5 |   |   |   |   |   |

$i = x \neq 3$   
 $j = x \neq 3$   
 $x \neq 3$   
 $x \neq 3$   
 $x \neq 3$

input

```
D D D D *
D D D *
D D *
D *
*
*
*
*
```

