

Προγραμματισμός Η/Υ

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Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1	3	7	9	10	13	17
---	---	---	---	----	----	----

Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1	3	7	9	10	13	17
---	---	---	---	----	----	----



Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----

Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1

3

7

9

10

13

17



1

3

7

9

10

13

17



Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1

3

7

9

10

13

17



1

3

7

9

10

13

17



1

3

7

9

10

13

17

Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

11

x

1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----



Δυαδική Αναζήτηση

ΕΙΣΟΔΟΣ:

target

x

1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----



1	3	7	9	10	13	17
---	---	---	---	----	----	----

ΕΞΟΔΟΣ:

pos

Διαδική Αναζήτηση σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int left, right, mid, found, target;
    final int n=7;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();

    System.out.printf("Enter the target element: ");
    target = input.nextInt();
```

```
        found = 0;
        left = 0;
        right = n-1;

        if (found == 0)
            System.out.println("Target not found");
        else
            System.out.println("Position = " + mid);
    }
```

Διαδική Αναζήτηση σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int left, right, mid, found, target;
    final int n=7;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();

    System.out.printf("Enter the target element: ");
    target = input.nextInt();
```

```
    found = 0;
    left = 0;
    right = n-1;

    while ( (left <= right) && (found == 0) )
    {
        mid = (left+right)/2;
        if ( x[mid] == target )
            found = 1;
        if ( x[mid] < target )
            left = mid+1;
        if ( x[mid] > target )
            right = mid-1;
    }

    if (found == 0)
        System.out.println("Target not found");
    else
        System.out.println("Position = " + mid);
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17
left	right	mid	found	target	n		
0	6		0	11	7		

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
{
    mid = (left+right)/2;
    if ( x[mid] == target )
        found = 1;
    if ( x[mid] < target )
        left = mid+1;
    if ( x[mid] > target )
        right = mid-1;
}
```

```
if (found == 0)
    System.out.println("Target not found");
else
    System.out.println("Position = " + mid);
```

```
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17
left	right	mid	found	target	n		
0	6	3	0	11	7		

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
{
    mid = (left+right)/2;
    if ( x[mid] == target )
        found = 1;
    if ( x[mid] < target )
        left = mid+1;
    if ( x[mid] > target )
        right = mid-1;
}
```

```
if (found == 0)
    System.out.println("Target not found");
else
    System.out.println("Position = " + mid);
```

```
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17
left	0	6	3	0	11	7	
right							
mid							
found							
target							
n							

4

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
{
```

```
    mid = (left+right)/2;
    if ( x[mid] == target )
        found = 1;
    if ( x[mid] < target )
        left = mid+1;
    if ( x[mid] > target )
        right = mid-1;
```

```
}
```

```
if (found == 0)
    System.out.println("Target not found");
else
    System.out.println("Position = " + mid);
```

```
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17
left	0	6	3	0	11	7	
	4		5				

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
{
```

```
    mid = (left+right)/2;
    if ( x[mid] == target )
        found = 1;
    if ( x[mid] < target )
        left = mid+1;
    if ( x[mid] > target )
        right = mid-1;
```

```
}
```

```
if (found == 0)
    System.out.println("Target not found");
else
    System.out.println("Position = " + mid);
```

```
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17

left	right	mid	found	target	n
0	6	3	0	11	7
4	4	5			

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
{
```

```
    mid = (left+right)/2;
    if ( x[mid] == target )
        found = 1;
    if ( x[mid] < target )
        left = mid+1;
    if ( x[mid] > target )
        right = mid-1;
```

```
}
```

```
if (found == 0)
    System.out.println("Target not found");
else
    System.out.println("Position = " + mid);
```

```
}
```

Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17

left	right	mid	found	target	n
0	6	3	0	11	7
4	4	5			
		4			

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
```

```
{
```

```
    mid = (left+right)/2;
```

```
    if ( x[mid] == target )
```

```
        found = 1;
```

```
    if ( x[mid] < target )
```

```
        left = mid+1;
```

```
    if ( x[mid] > target )
```

```
        right = mid-1;
```

```
}
```

```
if (found == 0)
```

```
    System.out.println("Target not found");
```

```
else
```

```
    System.out.println("Position = " + mid);
```

```
}
```


Διαδική Αναζήτηση σε Java

	[0]	[1]	[2]	[3]	[4]	[5]	[6]
x	1	3	7	9	10	13	17

left	right	mid	found	target	n
0	6	3	0	11	7
4	4	5			
5		4			

Target not found

```
found = 0;
left = 0;
right = n-1;
```

```
while ( (left <= right) && (found == 0) )
```

```
{
```

```
    mid = (left+right)/2;
```

```
    if ( x[mid] == target )
```

```
        found = 1;
```

```
    if ( x[mid] < target )
```

```
        left = mid+1;
```

```
    if ( x[mid] > target )
```

```
        right = mid-1;
```

```
}
```

```
if (found == 0)
```

```
    System.out.println("Target not found");
```

```
else
```

```
    System.out.println("Position = " + mid);
```

```
}
```

Ταξινόμηση 3 Αριθμών σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    Int temp;
    final int n=3;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
System.out.println("The sorted numbers are:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
```

```
}
```

Ταξινόμηση 3 Αριθμών σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int temp;
    final int n=3;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
    if (x[0] > x[1])
    {
        temp = x[0]; x[0] = x[1]; x[1] = temp;
    }

    if (x[1] > x[2])
    {
        temp = x[1]; x[1] = x[2]; x[2] = temp;
    }

    System.out.println("The sorted numbers are:");

    for (i=0; i<n; i++)
        System.out.printf("%d\t", x[i]);

}
```

Ταξινόμηση 3 Αριθμών σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int temp;
    final int n=3;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
    if (x[0] > x[1])
    {
        temp = x[0]; x[0] = x[1]; x[1] = temp;
    }

    if (x[1] > x[2])
    {
        temp = x[1]; x[1] = x[2]; x[2] = temp;
    }

    if (x[0] > x[1])
    {
        temp = x[0]; x[0] = x[1]; x[1] = temp;
    }

    System.out.println("The sorted numbers are:");

    for (i=0; i<n; i++)
        System.out.printf("%d\t", x[i]);

}
```

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



2	7	1	9
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



2	7	1	9
---	---	---	---

2ο Πέρασμα

2	7	1	9
---	---	---	---



2	7	1	9
---	---	---	---



2	1	7	9
---	---	---	---



Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



2	7	1	9
---	---	---	---

2ο Πέρασμα

2	7	1	9
---	---	---	---



2	7	1	9
---	---	---	---



2	1	7	9
---	---	---	---

3ο Πέρασμα

2	1	7	9
---	---	---	---



1	2	7	9
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

Συγκρίσεις: 3

2

1

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



2	7	1	9
---	---	---	---

2ο Πέρασμα

2	7	1	9
---	---	---	---



2	7	1	9
---	---	---	---



2	1	7	9
---	---	---	---

3ο Πέρασμα

2	1	7	9
---	---	---	---



1	2	7	9
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

ΕΙΣΟΔΟΣ

9	2	7	1
---	---	---	---

Συγκρίσεις: 3

+

2

+

1

=

6

1ο Πέρασμα

9	2	7	1
---	---	---	---



2	9	7	1
---	---	---	---



2	7	9	1
---	---	---	---



2	7	1	9
---	---	---	---

2ο Πέρασμα

2	7	1	9
---	---	---	---



2	7	1	9
---	---	---	---



2	1	7	9
---	---	---	---

3ο Πέρασμα

2	1	7	9
---	---	---	---



1	2	7	9
---	---	---	---

Ταξινόμηση Πίνακα με Bubblesort

[0]	[1]	...	[n-1]
9	2	...	1

Συγκρίσεις: $n-1$ + $n-2$ + ... + 1

1ο Πέρασμα



2ο Πέρασμα



...

(n-1) Πέρασμα



Ταξινόμηση Πίνακα με Bubblesort

[0]	[1]	...	[n-1]
9	2	...	1

Συγκρίσεις: $n-1$ + $n-2$ + ... + 1 = $n(n-1)/2$

1ο Πέρασμα



2ο Πέρασμα



...

(n-1) Πέρασμα



Υλοποίηση BubbleSort σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int i, pass, temp;
    final int n=4;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
        System.out.println("The sorted array is:");

        for (i=0; i<n; i++)
            System.out.printf("%d\t", x[i]);
    }
```

Υλοποίηση BubbleSort σε Java

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int i, pass, temp;
    final int n=4;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
        for (pass = 1; pass<n; pass++)
            for (i=0; i<n-pass; i++)
                if ( x[i] > x[i+1] )
                    {
                        temp = x[i];
                        x[i] = x[i+1];
                        x[i+1] = temp;
                    }

        System.out.println("The sorted array is:");

        for (i=0; i<n; i++)
            System.out.printf("%d\t", x[i]);
    }
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1

i	pass	temp	n
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="4"/>

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

System.out.println("The sorted array is:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1

i	pass	temp	n
0	1		4

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

System.out.println("The sorted array is:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9		

i	pass	temp	n
0	1	9	4

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

System.out.println("The sorted array is:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9		

i	pass	temp	n
0	1	9	4
1			

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

System.out.println("The sorted array is:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9	9	
		7		

i	pass	temp	n
0	1	9	4
1		9	

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
        {
            temp = x[i];
            x[i] = x[i+1];
            x[i+1] = temp;
        }
```

```
System.out.println("The sorted array is:");
```

```
for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
```

```
}
```


Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9	9	
		7		

i	pass	temp	n
0	1	9	4
1		9	
2			

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }
```

```
System.out.println("The sorted array is:");
```

```
for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
```

```
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9	9	9
		7	1	

i	pass	temp	n
0	1	9	4
1		9	
2		9	

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
        {
            temp = x[i];
            x[i] = x[i+1];
            x[i+1] = temp;
        }
```

```
System.out.println("The sorted array is:");
```

```
for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
```

```
}
```

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9	9	9
		7	1	

i	pass	temp	n
0	1	9	4
1		9	
2		9	
3			

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
        {
            temp = x[i];
            x[i] = x[i+1];
            x[i+1] = temp;
        }
```

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3			
0			

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        if ( x[i] > x[i+1] )
        {
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    for (i=0; i<n-pass; i++)
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1	2	9	
2		9	
3		7	
0			
1			
2			

```

for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }
    
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3		7	
0			
1			
2			
0			

```

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    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
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	1	7	1	
		1	7	
		2		

i	pass	temp	n
0	1	9	4
1	2	9	
2	3	9	
3		7	
0		2	
1			
2			
0			

```

for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

```

System.out.println("The sorted array is:");

```

for (i=0; i<n; i++)
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```

}

Υλοποίηση BubbleSort σε Java

	[0]	[1]	[2]	[3]
x	9	2	7	1
	2	9	9	9
	1	7	1	
		1	7	
		2		
i		pass	temp	n
0	1	9	4	
1	2	9		
2	3	9		
3		7		
0		2		
1				
2				
0				
1				

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
        {
            temp = x[i];
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        }
```

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```
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	1	7	1	
		1	7	
		2		

i	pass	temp	n
0	1	9	4
1	2	9	
2	3	9	
3	4	7	
0		2	
1			
2			
0			
1			

```

for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }
    
```

System.out.println("The sorted array is:");

```

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
    
```

}

BubbleSort με Αντίστροφη Διαπέραση

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int i, pass, temp;
    final int n=4;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
for (pass = 1; pass<n; pass++)
    for (i=n-2; i>=pass-1; i--)
        if ( x[i] > x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

    System.out.println("The sorted array is:");

    for (i=0; i<n; i++)
        System.out.printf("%d\t", x[i]);
}
```

Ταξινομήστε Πίνακα σε Φθίνουσα Σειρά

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int i, pass, temp;
    final int n=4;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
System.out.println("The sorted array is:");

for (i=0; i<n; i++)
    System.out.printf("%d\t", x[i]);
}
```

Ταξινομήστε Πίνακα σε Φθίνουσα Σειρά

```
public static void main (String[ ] args)
{
    Scanner input = new Scanner( System.in );
    int x[ ];
    int i, pass, temp;
    final int n=4;

    x = new int[n];
    System.out.printf("Enter %d integers: ", n);

    for (i=0; i<n; i++)
        x[i] = input.nextInt();
```

```
for (pass = 1; pass<n; pass++)
    for (i=0; i<n-pass; i++)
        if ( x[i] < x[i+1] )
            {
                temp = x[i];
                x[i] = x[i+1];
                x[i+1] = temp;
            }

    System.out.println("The sorted array is:");

    for (i=0; i<n; i++)
        System.out.printf("%d\t", x[i]);
}
```