

Tinker Academy

Programming Using Java
(Java Arrays)

Java Arrays

Creating 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = new int[10];  
    }  
}
```

1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int a = 9;  
        int[] arr = new int[a + 1];  
    }  
}
```

1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr;  
        arr = new int[10];  
    }  
}
```

1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,0,0,0,0,0,0,0,0};  
    }  
}
```

1D Array

Java Arrays

Length of 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = new int[10];  
        int length = arr.length;  
    }  
}
```

1D Array

Use the field "length" to get length of array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = new int[10];  
        arr.length = 200;  
    }  
}
```

1D Array

Length of an array cannot be changed

Java Arrays

Accessing elements of 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        int elem = arr[0];  
    }  
}
```

1D Array

First element is accessed as arr[0]

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        int i = 4;  
        int elem = arr[arr.length - 1];  
    }  
}
```

1D Array

Last element is access as arr[arr.length-1]

Java Arrays

Accessing elements of 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        int i = 3;  
        int elem = arr[i*2+1];  
    }  
}
```

1D Array

An element is accessible using expression

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        int i = 4;  
        int elem = arr[arr.length];  
    }  
}
```

1D Array

Accessing using invalid index is an error

Java Arrays

Looping through elements of 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        for (int i = 0; i < arr.length; i++) {  
            int elem = arr[i];  
        }  
    }  
}
```

1D Array

for loop with increment to loop forward

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        for (int i = arr.length-1; i >= 0; i--) {  
            int elem = arr[i];  
        }  
    }  
}
```

1D Array

for loop with increment to loop reverse

Java Arrays

Modify element of 1D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        for (int i = 0; i < arr.length; i++) {  
            arr[i] = arr[i] + 1;  
        }  
    }  
}
```

1D Array

Any element of an arr can be modified

```
public class Main {  
    public static void main(String[] args) {  
        int[] arr = {0,1,2,3,4,5,6,7,8,9};  
        for (int i = 0; i < arr.length/2; i++) {  
            int elem1 = arr[i];  
            int elem2 = arr[arr.length - 1 - i];  
            arr[i] = elem2;  
            arr[arr.length - 1 - i] = elem1;  
        }  
    }  
}
```

1D Array

Modify several elements in one loop

Java Arrays

Creating 2D Arrays

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = new int[2][3];  
    }  
}
```

2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int a = 1;  
        int[][] arr = new int[a + 1][3];  
    }  
}
```

2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr;  
        arr = new int[2][3];  
    }  
}
```

2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = { { 0,0, 0 }, { 0,0, 0 } };  
    }  
}
```

2D Array

Java Arrays

Lengths of 2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = new int[2][3];  
        int length1 = arr.length;  
        int length2 = arr[0].length;  
    }  
}
```

2D Array

Array at dimension has own "length" field

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = new int[2][3];  
        arr.length = 200;  
        arr[0].length = 200;  
    }  
}
```

2D Array

Length of an array cannot be changed

Java Arrays

Accessing elements of 2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        int i = 1;  
        int j = 2;  
        int elem = arr[i][j];  
    }  
}
```

2D Array

An element is accessible using expression

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        int i = 2;  
        int j = 3;  
        int elem = arr[i][j];  
    }  
}
```

2D Array

Accessing using invalid index is an error

Java Arrays

Looping through elements of 2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        for (int i = 0; i < arr.length; i++) {  
            for (int j = 0; j < arr[0].length; j++) {  
                int elem = arr[i][j];  
            }  
        }  
    }  
}
```

2D Array

for loop with increment to loop forward

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        for (int i = arr.length-1; i >= 0; i--) {  
            for (int j = arr.length-1; j >= 0; j--) {  
                int elem = arr[i][j];  
            }  
        }  
    }  
}
```

2D Array

for loop with increment to loop reverse

Java Arrays

Modify element of 2D Array

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        for (int i = 0; i < arr.length; i++) {  
            for (int j = 0; j < arr[0].length; j++) {  
                arr[i][j] = arr[i][j] + 1;  
            }  
        }  
    }  
}
```

2D Array

Any element of an arr can be modified

```
public class Main {  
    public static void main(String[] args) {  
        int[][] arr = {{0,1,2},{3,4,5}};  
        for (int i = 0; i < arr.length; i++) {  
            arr[i] = {1,2,3};  
        }  
    }  
}
```

2D Array

illegal to replace second dimension array