# Arrays & while Loops

Java
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Arrays right now aren’t useful to us…

```
int [] arr = new int[5];
arr[0] = 5;
arr[1] = 5;
arr[2] = 5;
arr[3] = 5;
arr[4] = 5;
```

When using them like this, they’re just like making multiple variables.

# Basic While Loop

```
int i = 0;
while(i < 5){

    i++;
}
```

How many times does this loop run?

# Combining While Loops and Arrays

```
int [] arr = new int[5];
int i = 0;
while(i < 5){

    i++;
}
```

Since this loop runs **5 times**,
And our array holds **5 values**,

How can we utilize this loop?

# Combining While Loops and Arrays

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

This loop assigns 5 to every element in the array.

# While Loop - Walkthrough

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | |
| | |
| | |
| | |
| | |

**arr** has **5** elements,
**arr** is **empty**.

**i** start at **0**.

Orange arrow indicates what line of code we're on.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | | | | | |

On the left is the stored values of the array arr.

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | |
| | |
| | |
| | |
| | |

**i** is **0**,
**0 < 5** is **true**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | | | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| | |
| | |
| | |
| | |

**i** is currently 0

**arr** of index **i** is the **0th index**.

**arr[i]** is **arr[0]**

So **arr[0] stores** the **value 5**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | |
| | |
| | |
| | |

**i** increases to **1**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | |
| | |
| | |
| | |

**Start over**

**i** is **1**
**1 < 5** is **true**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| | |
| | |
| | |

**arr[i]** is **arr[1]**

**arr[1]** stores **5**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | |
| | |
| | |

**i** increases to **2**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | |
| | |
| | |

**i** is **2**
**2 < 5** is **true**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| | |
| | |

**arr[i]** is **arr[2]**

**arr[2]** stores **5**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | |
| | |

**i** increases to **3**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | |
| | |

**i** is **3**
**3 < 5** is **true**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| | |

**arr[i]** is **arr[3]**

**arr[3]** stores **5**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | |

**i** increases to **4**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | |

**i** is **4**
**4 < 5** is **true**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | 5 |

**arr[i]** is **arr[4]**

**arr[4]** stores **5**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | 5 |

# While Loop - Walkthrough

```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

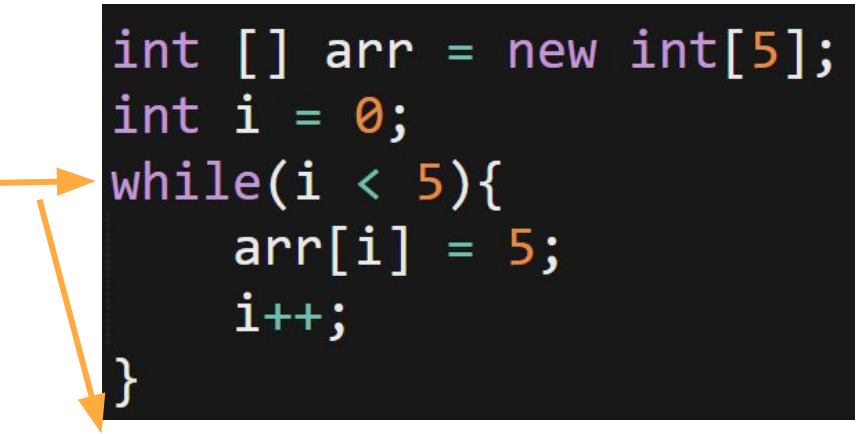
| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | 5 |

5

**i** increases to **5**.

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | 5 |

# While Loop - Walkthrough



```
int [] arr = new int[5];
int i = 0;
while(i < 5){
    arr[i] = 5;
    i++;
}
```

| i | arr[i] |
|---|---|
| 0 | 5 |
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | 5 |

5

**i** is **5**
**5 < 5** is **FALSE**

**This ends the loop**

| arr | | | | | |
|---|---|---|---|---|---|
| **Index** | 0 | 1 | 2 | 3 | 4 |
| **Value** | 5 | 5 | 5 | 5 | 5 |

# Lab: Array & while Loops

- Make 1000 random integers in an array
- Use an independent while loop to print them all out