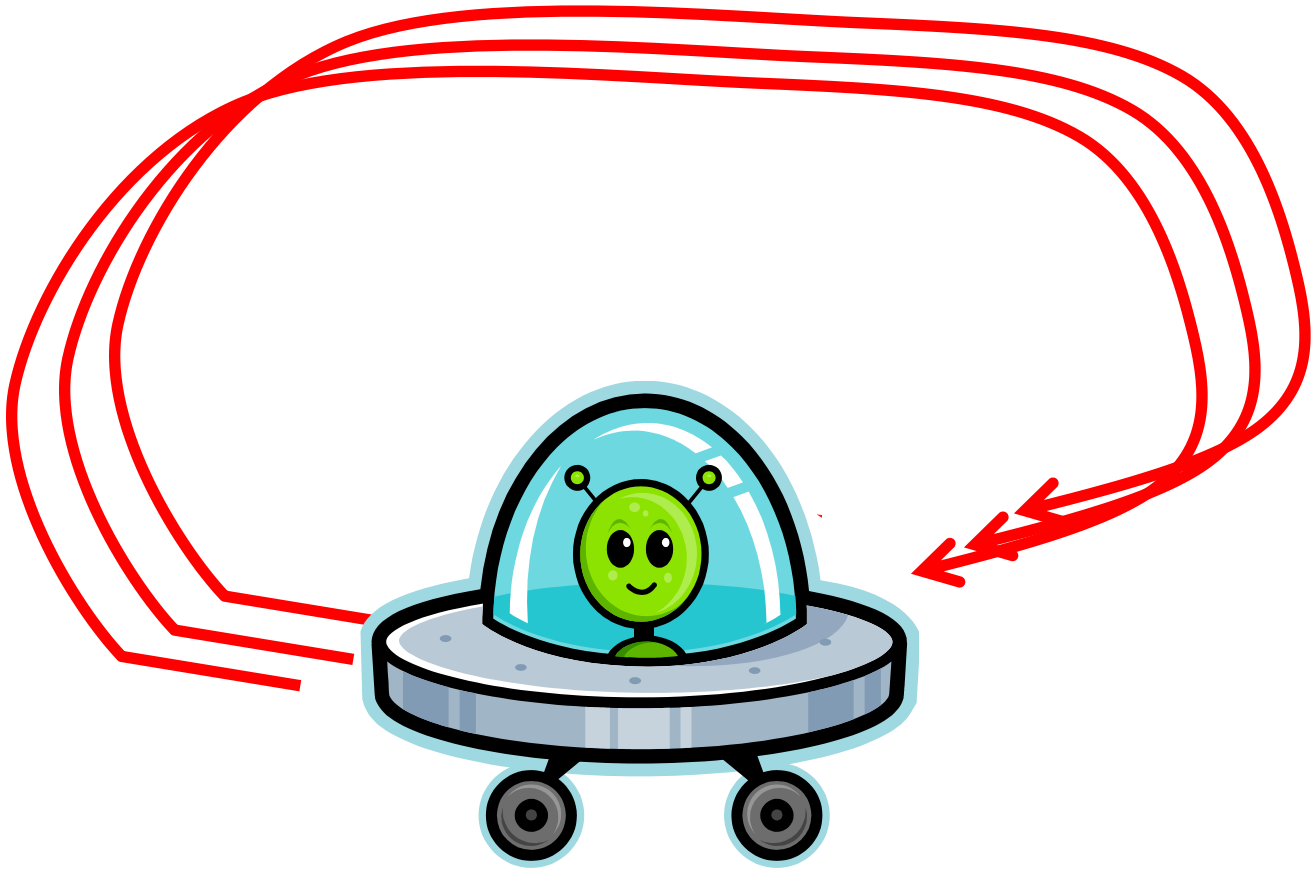
Other conditional and loop constructs



Overview

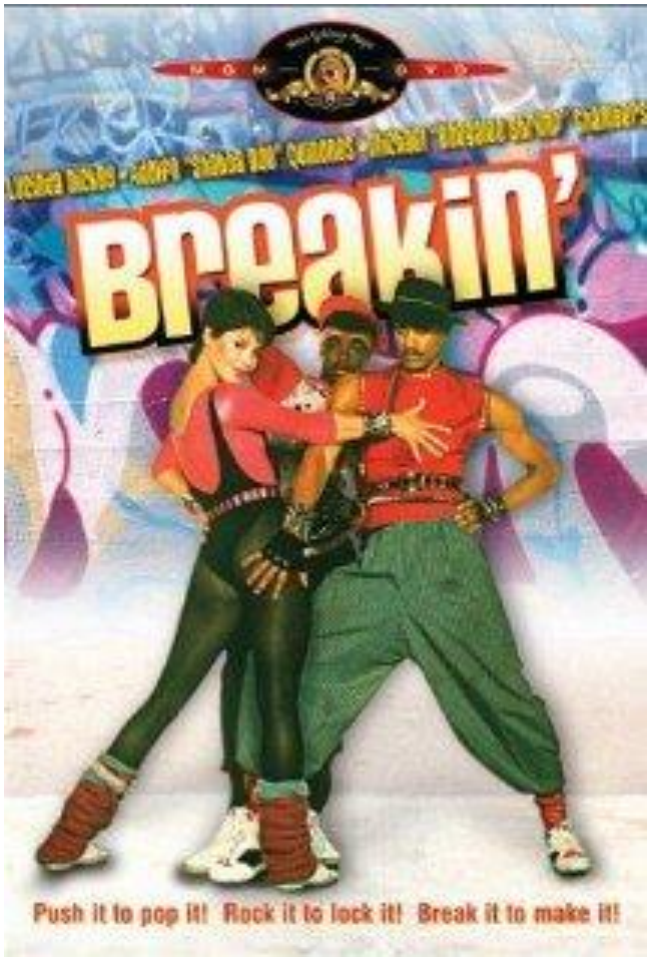
- Current loop constructs:
  - `for, while, do-while`
- New loop constructs
  - Get out of loop early: `break`
  - Skip rest of current loop: `continue`
- Current conditionals:
  - `if, if-else, if-else if`
- New conditional:
  - When you have many choices: `switch`

Breaking out

- Loops normally go until loop condition false

```
int i = 0
while (i < 100)
{
  // Do some stuff
  i++;
}
```

```
for (int i = 0; i < 100; i++)
{
  // Do some stuff
}
```



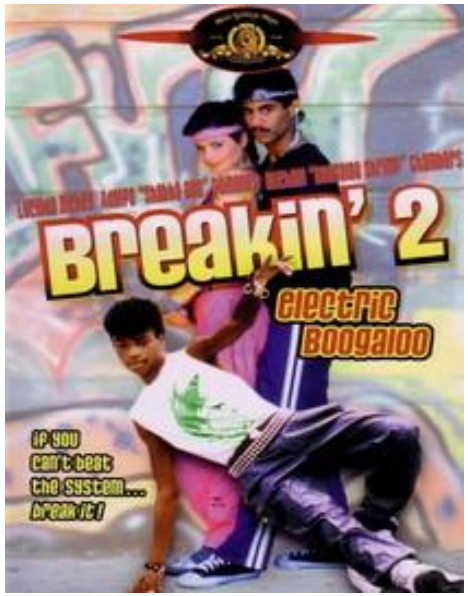
- break statement
  - Exit a loop immediately
  - No iteration, no increment
  - No condition check
  - Straight to the code after loop

Breaking out 2

- break statement
  - Terminates enclosing loop: for, while, or do-while
  - Goal: sum data array, check for invalid negative values

```
int [] data = {1, 2, 10, 5, -1, 5, 0};
int i = 0;
int sum = 0;
while (???1???)
{
  if (???2???)
     break;
  sum += data[i];
  i++;
}
if (???3???)
   System.out.println("Invalid data!");
else
   System.out.println("Sum: " + sum);
```

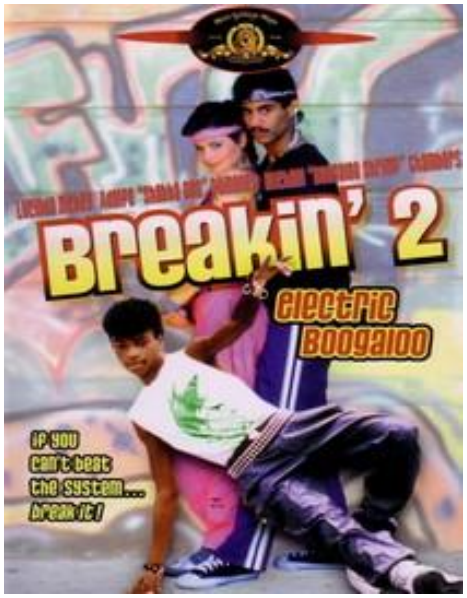
This lists tells Java how big the array should be and the initial values in each element.



Breaking out 2

- break statement
  - Terminates enclosing for-loop, while-loop, do-while loop
  - Goal: sum data array, check for invalid negative values

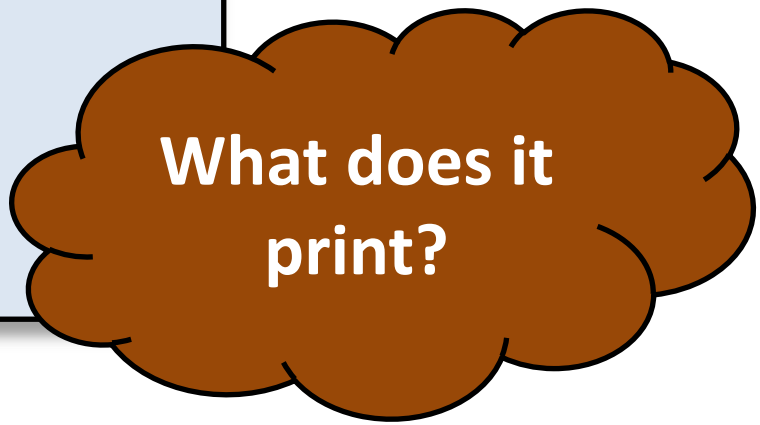
```
int [] data = {1, 2, 10, 5, -1, 5, 0};
int i = 0;
int sum = 0;
while (i < data.length)
{
  if (data[i] < 0)
     break;
  sum += data[i];
  i++;
}
if (i < data.length)
   System.out.println("Invalid data!");
else
   System.out.println("Sum: " + sum);
```



Skipping and continuing loop

- `continue` statement
  - Skip rest of for-loop, while-loop, do-while body
  - Goal: sum `data` array, skipping invalid negative values

```
int [] data = {1, 2, 10, 5, -1, 5, 0};
int i = 0;
int sum = 0;
for (i = 0; i < data.length; i++)
{
  if (data[i] < 0)
     ???1???;
  sum += data[i];
}
System.out.println("Sum: " + sum);
```



Skipping and continuing loop

- `continue` statement
  - Skip rest of for-loop, while-loop, do-while body
  - Goal: sum `data` array, skipping invalid negative values

```
int [] data = {1, 2, 10, 5, -1, 5, 0};
int i = 0;
int sum = 0;
for (i = 0; i < data.length; i++)
{
  if (data[i] < 0)
     continue;
  sum += data[i];
}
System.out.println("Sum: " + sum);
```

```
% java SumNumsSkip
sum = 23
```

Conditional action from a set

- Do something depending on a value value
  - if-else if-else if... statements can get tedious

```
if (day == 1)
   monthStr = "Monday";
else if (day == 2)
   monthStr = "Tuesday";
else if (day == 3)
   monthStr = "Wednesday";
else if (day == 4)
   monthStr = "Thursday";
else if (day == 5)
   monthStr = "Friday";
else if (day == 6)
   monthStr = "Saturday";
else if (day == 7)
   monthStr = "Sunday";
else
   monthStr = "Invalid day!";
```

Set a String variable `monthStr` to a string according to the integer value in the `day` variable.

Conditional action from a set

- `switch` statement
  - Works with: `byte, short, char, int, enumerations`
  - Java 1.7: `String`

```
switch (day)
{
   case 1:  monthStr = "Monday";       break;
   case 2:  monthStr = "Tuesday";      break;
   case 3:  monthStr = "Wednesday";    break;
   case 4:  monthStr = "Thursday";     break;
   case 5:  monthStr = "Friday";       break;
   case 6:  monthStr = "Saturday";     break;
   case 7:  monthStr = "Sunday";       break;
  default: monthStr = "Invalid day!"; break;
}
```

case block normally ends with a break

default block is optional, but if present executes if no other case matched. Like the else in an if-else if-else statement.

switch statement

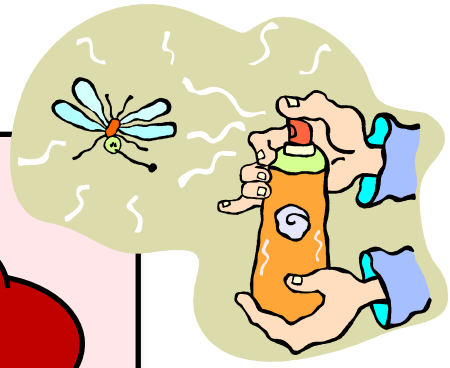
```
final int NORTH = 0;
final int SOUTH = 1;
final int EAST  = 2;
final int WEST  = 3;

int direction   = 0;

switch (direction)
{
   case NORTH:
      y--;
      System.out.println("Walking north");
      break;
   case SOUTH:
      y++;
      System.out.println("Walking south");
      break;
   case EAST:
      x++;
      System.out.println("Walking east");
      break;
   case WEST:
      x--;
      System.out.println("Walking west");
   break;
}
```

You can have as many statements as you want between case and break.

Buggy switch statement



```
final int NORTH = 0;
final int SOUTH = 1;
final int EAST  = 2;
final int WEST  = 3;
int direction = 0;

switch (direction)
{
   case NORTH:
      y--;
      System.out.println("Walking north");
   case SOUTH:
      y++;
      System.out.println("Walking south");
   case EAST:
      x++;
      System.out.println("Walking east");
   case WEST:
      x--;
      System.out.println("Walking west");
}
```

case block will fall through to next block if no break!

```
Output:

Walking north
Walking south
Walking east
Walking west
```

Falling through cases

```
int direction = 0;

switch (action)
{
   case NORTHWEST:
   case NORTHEAST:
   case NORTH:
      System.out.println("Heading northbound!");
      break;
   case SOUTHWEST:
   case SOUTHEAST:
   case SOUTH:
      System.out.println("Walking southbound!");
      break;
}
```

Sometimes falling through to next case block is what you want.

Easy way to do same thing for a set of discrete values.

```
Output:

Heading southbound
```

Summary

- New loop constructs:
  - Get out of loop early: `break`
    - Break is terminal for loop
    - Associated with closest enclosing loop
  - Skip rest of current loop: `continue`
    - Loop continues to execute
- New conditional:
  - When you have many choices: `switch`
  - Useful when you have many choices
  - Be careful to use `break` statement after each case