

COMP 110/L Lecture 10

Kyle Dewey

Outline

- “Random” numbers
- `if / else if / ... /else`

Random Numbers

Random Numbers

Random numbers can be generated with

```
java.util.Random
```

Random Numbers

Random numbers can be generated with
`java.util.Random`

```
Random r = new Random();  
int i = r.nextInt();
```

(generates any random integer)

Random Numbers

Random numbers can be generated with
`java.util.Random`

```
Random r = new Random();  
int isRandom = r.nextInt();
```

(generates any random integer)

```
Random r = new Random();  
int isRandom = r.nextInt(10);
```

Random Numbers

Random numbers can be generated with
`java.util.Random`

```
Random r = new Random();  
int isRandom = r.nextInt();
```

(generates any random integer)

```
Random r = new Random();  
int isRandom = r.nextInt(10);
```

**(generates one of the following random integers:
0, 1, 2, 3, 4, 5, 6, 7, 8, 9)**

Example:

RandomExample.java

How Random Works

- Not actually random, but *pseudorandom*
- General idea:
 - Start with a *seed* value
 - Do a computation on it
 - Computation produces a pseudorandom value and a new seed
 - Repeat for infinity

Passing Seed Values

Seeds can be explicitly passed to `Random`

Passing Seed Values

Seeds can be explicitly passed to Random

```
Random r = new Random(123);  
// seed is 123  
int isRandom = r.nextInt();
```

Passing Seed Values

Seeds can be explicitly passed to Random

```
Random r = new Random(123);  
// seed is 123  
int isRandom = r.nextInt();
```

Always produces -1188957731

Example:

RandomExampleWithSeed.java

Utility of Setting Seeds

Predictable random values mean predictable tests.

Utility of Setting Seeds

Predictable random values mean predictable tests.

```
@Test
public void testRandomCalculation() {
    long seed = 1231;
    assertEquals(Something.calc(seed),
                 42);
}
```

Without Explicit Seeds

If no seed is passed, `Random` will generate a seed based off of another source, such as the current time.

Without Explicit Seeds

If no seed is passed, Random will generate a seed based off of another source, such as the current time.

```
Random r = new Random();  
int isRandom = r.nextInt();
```

```
if / else if /... /else
```

`if / else`

So far: only two branches allowed

if / else

So far: only two branches allowed

```
if (x > 5) {  
    return 7;  
} else {  
    return 8;  
}
```

`if / else` With More Than Two Branches

More branches are possible

`if / else` With More Than Two Branches

More branches are possible

```
if (x == 0) {  
    return 7;  
} else if (x < 10) {  
    return 8;  
} else if (x > 50) {  
    return 9;  
} else {  
    return 10;  
}
```

Example:

`IfElseIfElse.java`

Note on Testing

Good idea to have at least one test for each branch

Note on Testing

Good idea to have at least one test for each branch

```
if (x == 0) {  
    return 7;  
} else if (x < 10) {  
    return 8;  
} else if (x > 50) {  
    return 9;  
} else {  
    return 10;  
}
```

Note on Testing

Good idea to have at least one test for each branch

**Good test
inputs?**

```
if (x == 0) {  
    return 7;  
} else if (x < 10) {  
    return 8;  
} else if (x > 50) {  
    return 9;  
} else {  
    return 10;  
}
```

Note on Testing

Good idea to have at least one test for each branch

Good test
inputs?

```
if (x == 0) { 0
    return 7;
} else if (x < 10) {
    return 8;
} else if (x > 50) {
    return 9;
} else {
    return 10;
}
```

Note on Testing

Good idea to have at least one test for each branch

Good test
inputs?

```
if (x == 0) { 0
    return 7;
} else if (x < 10) { 1
    return 8;
} else if (x > 50) {
    return 9;
} else {
    return 10;
}
```

Note on Testing

Good idea to have at least one test for each branch

Good test
inputs?

```
if (x == 0) { 0
    return 7;
} else if (x < 10) { 1
    return 8;
} else if (x > 50) { 51
    return 9;
} else {
    return 10;
}
```

Note on Testing

Good idea to have at least one test for each branch

Good test
inputs?

```
if (x == 0) { 0
    return 7;
} else if (x < 10) { 1
    return 8;
} else if (x > 50) { 51
    return 9;
} else { 50
    return 10;
}
```

Example:

```
IfElseIfElseTest.java
```