

**CS 180: Problem Solving and
Object-Oriented Programming**

Lecture 6: Selection Continued

Dr. Jeff Turkstra



Supplemental Instruction

- New SI leader: Aaryan Desai
 - Sessions on Tuesday and Thursday
7:30 - 8:20, GRIS 120
 - Office hours Thursday 12pm WILY C215
- Shree Kulkarni
 - Sessions on Monday and Wednesday
7:30 - 8:20, WALC 3127
 - Office hours Tuesday 12pm WILY C215



Lecture 06

- Float fun
- What if...
- switch



Problem: ChangeBack

- Comparing floats or doubles for equality
can be problematic
- Give the waiter a \$10 bill
`double paid = 10.00;`
 Check is \$9.10
`double check = 9.10;`
 Waiter gives you \$0.90 back
`double change = 0.90;`
 Does the math work out?
`(paid - check) == change`



```
public class ChangeBack {
    double computeChange(double check, double paid) {
        return paid - check;
    }

    public static void main(String[] args) {
        ChangeBack c = new ChangeBack();
        double change;

        change = c.computeChange(8, 10); // 2.00
        change = c.computeChange(9.10, 10); // 0.90
    }
}
```



- Real number representations are
imprecise
 - Comparisons won't always succeed as
expected
- Common trick:
 - if (`Math.abs(x - y) < epsilon`)
 - For some small value epsilon
 - Maybe 0.000001



Problem: Median

- Write the method...

```
double median(double a, double b, double c)
```



```
double median(double x, double y, double z) {  
    if (x <= y && y <= z || z <= y && y <= x)  
        return y;  
    else if (y <= x && x <= z || z <= x && x <= y)  
        return x;  
    else if (x <= z && z <= y || y <= z && z <= x)  
        return z;  
    else  
        return 0;  
}
```



Problem: FileExtensions

- Write a method that finds the extension in the provided filename...

```
String findExtension(String filename)
```



Version 1

```
String findExtension(String fname) {  
    int dot;  
    if (fname == null)  
        return "";  
    dot = fname.indexOf('.');  
    if (dot == -1)  
        return "";  
    String extension = fname.substring(dot, fname.length());  
    return extension;  
}
```



Version 2

```
String findExtension(String fname) {  
    int dot;  
    if (fname == null || (dot = fname.indexOf('.')) == -1)  
        return "";  
    String extension = fname.substring(dot, fname.length());  
    return extension;  
}
```



Problem: Days

- Write a method that returns the number of days in a given month from a given year

```
int daysInMonth(int month, int year)
```



```
int daysInMonth(int month, int year) {
    if (month == 1) // January
        return 31;
    else if (month == 2) {
        LeapYear ly = new LeapYear();
        if (ly.isLeapYear(year))
            return 29;
        else
            return 28;
    }
    else if (month == 3)
        return 31;
    else if (month == 4)
        return 30;
    else if (month == 5)
        return 31;
    else if (month == 6)
        return 30;
    else if (month == 7)
        return 31;
    else if (month == 8)
        return 31;
    else if (month == 9)
        return 30;
    else if (month == 10)
        return 31;
    else if (month == 11)
        return 30;
    else if (month == 12)
        return 31;
    return -1;
}
```

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Purdue trivia

- "Harry Creighton Peffer, first head of the School of Chemical Engineering, ordered a camera through normal university channels. Purchasing Agent H. C. Mahin wrote to ask Peffer what he intended to do with it. The implications of Mahin's query so angered Peffer that he fired back one of the best letters he ever regretted. It was, Peffer wrote to Mahin in high dudgeon, 'none of your goddam business' what he did with the camera, but since Mahin wanted to know, he intended to take pictures with it." The letter eventually made its way to President Elliott's desk. "Peffer was called to the president's office where Elliott told him that writing such a letter to an administrative officer was the same thing as writing it to him. Peffer was unimpressed. He pointed out to Elliott that he too was an administrative officer and that using the same logic, Elliott could conclude that he had written the letter to himself."
- "Peffer, what am I going to do with you?" the exasperated president asked.
- "I haven't the slightest idea," Peffer retorted.
- "Get out of here and get back to your office," Elliott said with finality.
- - A Century and Beyond, by Robert W. Topping

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```
int daysInMonth2 (int month, int year) {
    switch (month) {
        case 1: case 3: case 5: case 7: case 8: case 10: case 12:
            return 31;
        case 4: case 6: case 9: case 11:
            return 30;
        case 2:
            LeapYear ly = new LeapYear();
            if (ly.isLeapYear(year))
                return 29;
            else
                return 28;
    }
    return -1;
}
```

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switch

- Arbitrary number of execution paths, unlike if-then-else
- Works with byte, short, char, and int
 - Also Strings
 - Enumerated types
- Strings are compared using .equals()

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- switch (expression)
- Followed by "switch block"
 - Statements can be labeled
 - case n: or
 - default:
- Executes all statements following the case label matching expression
- Similar to if, else if, else if, ..., else
 - More concise and readable (when used correctly)

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Fall through

- All statements that follow a matching case label are executed, regardless of subsequent labels
 - Until a break statement is executed

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Problem: What stuff

- Write a method that returns a string indicating what items students are given based on their year in college
 - Seniors and Juniors (4 and 3) get a new backpack
 - Sophomores (2) get a new coat
 - Freshmen (1) get new gloves and a new coat

```
String whatStuff(int yearInCollege)
```

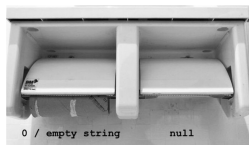


```
String whatStuff (int yearInCollege) {  
    String stuff = "You'll get ";  
    switch (yearInCollege) {  
        case 1:  
            stuff = stuff + "new gloves and ";  
        case 2:  
            stuff = stuff + "a new coat";  
            break;  
        case 3: case 4:  
            stuff = stuff + "a new backpack";  
            break;  
        default:  
            stuff = stuff + "nothing";  
            break;  
    }  
    return stuff;  
}
```



Strings, Empty Strings, Null Pointers

```
String fname = new String("fluffy.jpg");  
String fname = new String("");  
String fname = null;
```



A closer look at Scanner

- Time permitting



Boiler Up!

