

Testing a class; Control Structures

- Continued from last time:
 - test programs
 - incremental development
 - enhancing the **Student** class
- **if** statements
 - Ex: **PizzaCalc.java**
- Error-checking input
 - Ex: **NapCalc.java**
- Multi-way tests
 - Ex: **CommandProcessor.java**
- Dangling else
- De Morgan's Law

Announcements

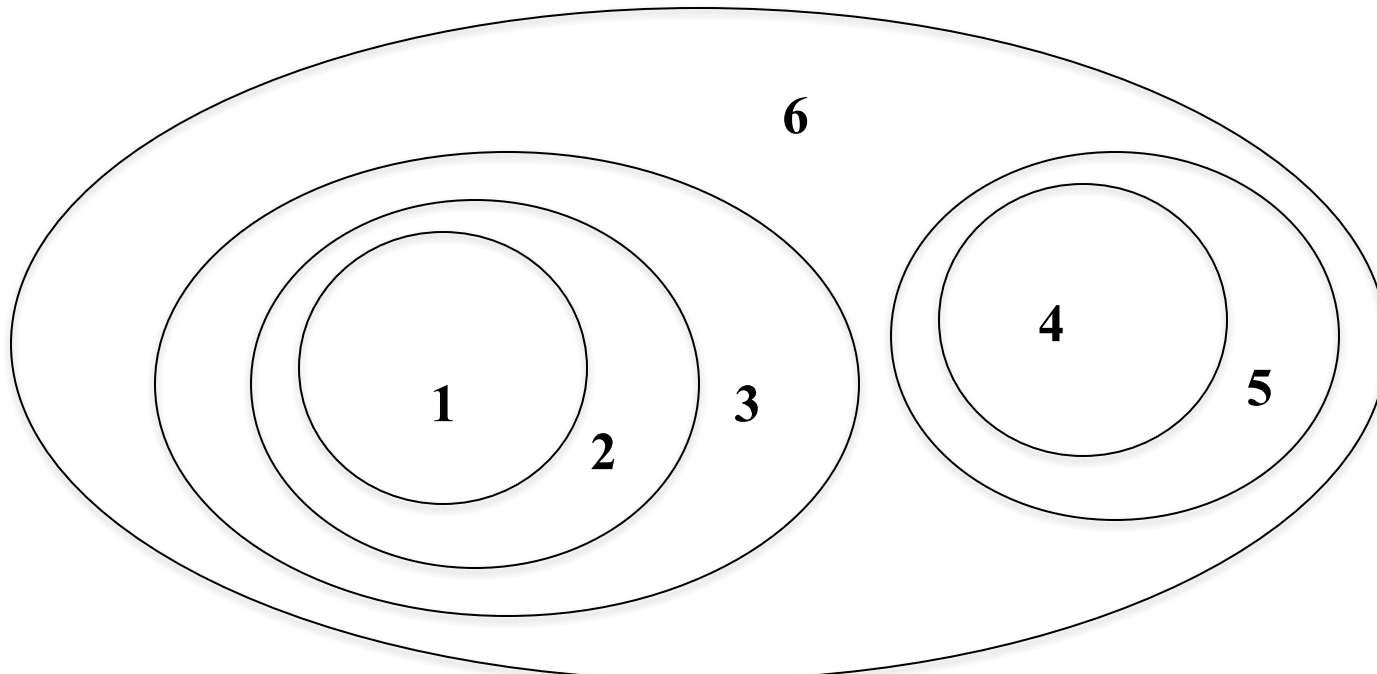
- Reminders:
 - PA1 due in about a week
 - Lab 3 has advanced prep: see lab for details
 - Assgt. and other questions: discussion board
- Claire's office hours changed for today.
- “Clarification file” for PA1
- Students that missed the first lecture, who are not officially enrolled (e.g., on waiting list), or who have no previous programming experience need to see me after class or in office hours today

Test programs

- **Student** class is not a complete program
- Could use in some larger app, or...
- first create a class to test the **Student** class:
 - **StudentTester**, will contain **main** method.
- Let's look at **StudentTester.java**

Incremental development

- App with 20 classes
- BAD: type in all the code and compile and run
- BETTER: test each class independently and make sure it works before integrating it:



Within-class incremental development

- Add functionality to a class incrementally and test as you go.
- Minimal: constructor plus accessors
- Test-driven design: design test cases and compute expected output BEFORE writing any code
- Let's enhance **Student** class, and use **StudentTester** to test the changes.

Control Structures

if indentation conventions

- always use curly brackets:

```
if (cond) {  
    action;  
}
```

```
if (cond)  
{  
    action;  
}
```

- line up right curly bracket with start of **if**
- body of **if** indented 2 - 4 spaces further
- left curly on same line or following line (both shown above)

if statement example

- let's compile and run **PizzaCalc.java**

Error-checking input

- Do `NapCalc.java` example.

Multi-way tests

- mutually exclusive conditions:
 - if-else-if construct
 - Don't keep nesting (and indenting):

```
if (cond) {  
    action1;  
}  
else if (cond2) {  
    action2;  
}  
else {  
    action3;  
}
```

Multi-way test example

- Ex: assign letter grade based on score in course:
90, 80, 70, 60

```
public static char getGrade(int score)
```

Multi-way test 2nd example

- Interpret one-word commands for an interactive console-based program.

CommandProcessor.java

- Do this example on your own (start with code that goes with today's lecture)

Dangling else

- Example (from review qn. R5.3 from text – 4th ed.):

```
language = "English";  
if (country.equals("Canada"))  
    if (province.equals("Quebec"))  
        language = "French";  
else if (country.equals("China"))  
    language = "Chinese";
```

De Morgan's laws

- test if **num** is between 0 and 10 inclusive:
- test the opposite condition:

see also Special Topic 5.7

De Morgan's laws (cont.)

- $!(A \ \&\& \ B)$ same as $(!A) \ || \ (!B)$
- $!(A \ || \ B)$ same as $(!A) \ \&\& \ (!B)$