# CISC 3115 TY2 Static Data Fields and Methods

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### Outline

- Just discussed
  - Default constructor
  - Accessing objects via reference variables
  - Primitive and reference variables
  - Garbage collection
  - A few classes in the Java Library (Java API)
- Instance and static data fields and methods

### "Static" and "Instance"

- Instance variables, instance methods
- Static variables, static methods, constants

### Instance Variables and Methods

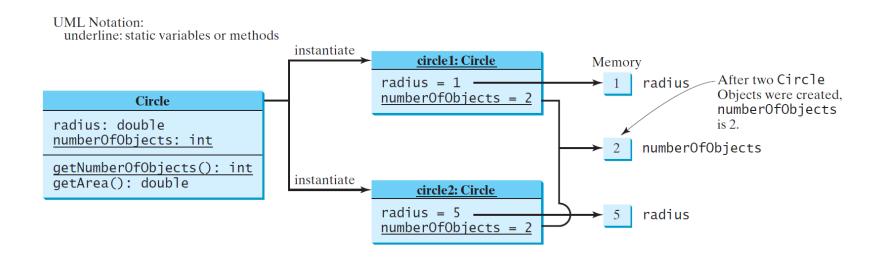
- Instance variables belong to an object of a class, i.e., a specific instance of the class
- Instance methods are invoked by an object of the class, i.e., an instance
  of the class.
- Defined in a class without using the "static" modifier

# Static Variables, Methods, and Constants

- Static variables are shared by all the objects (or instances) of the class.
- Static methods are not tied to a specific object (or instance).
- Static constants are <u>final</u> variables shared by all the objects (or instances) of the class.
  - Defined using the "final" modifier
  - Convention: all caps, separated by "\_" between words.
- Defined using the "static" modifier
- Also class variables, class methods

# Static Variables and Methods: UML Class Diagram

 In the UML class diagram, we underline the static variables or methods



## Static and Instance: Example

- Demonstrate the roles of instance and class variables and their uses.
  - A static (or class) variable numberOfObjects to track the number of Circle objects created.
    - See Circle.java and TestCircle.java in the Sample Programs for this lecture

### Questions: Instance and Static?

- In an instance method, can you
  - invoke an instance method?
  - access an instance variable?
  - invoke a static method?
  - access a static variable?
- In a static method, can you
  - invoke an instance method?
  - access an instance variable?
  - invoke a static method?
  - access a static variable?

## Questions: Instance and Static?

- In an instance method, can you
  - invoke an instance method?
  - access an instance variable?
  - invoke a static method?
  - access a static variable?
- In a static method, can you
  - invoke an instance method?
  - access an instance variable?
  - invoke a static method?
  - access a static variable?





### Questions?

- Instance variables/data fields, instance methods
- Static variables/data fields, static methods
- Constants