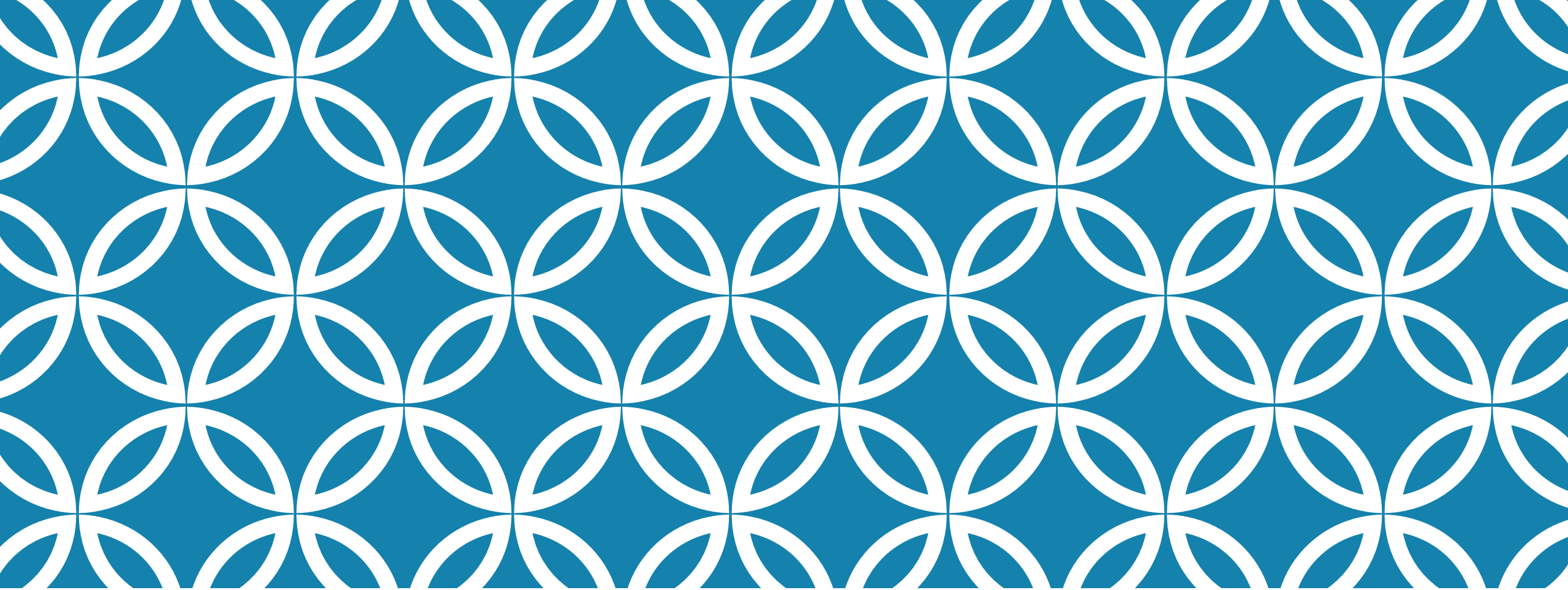


MIDTERM REVIEW

INFORMATION

Date: October 19th in class

Format: 20 to 30 multiple choice questions

Duration: 80 minutes

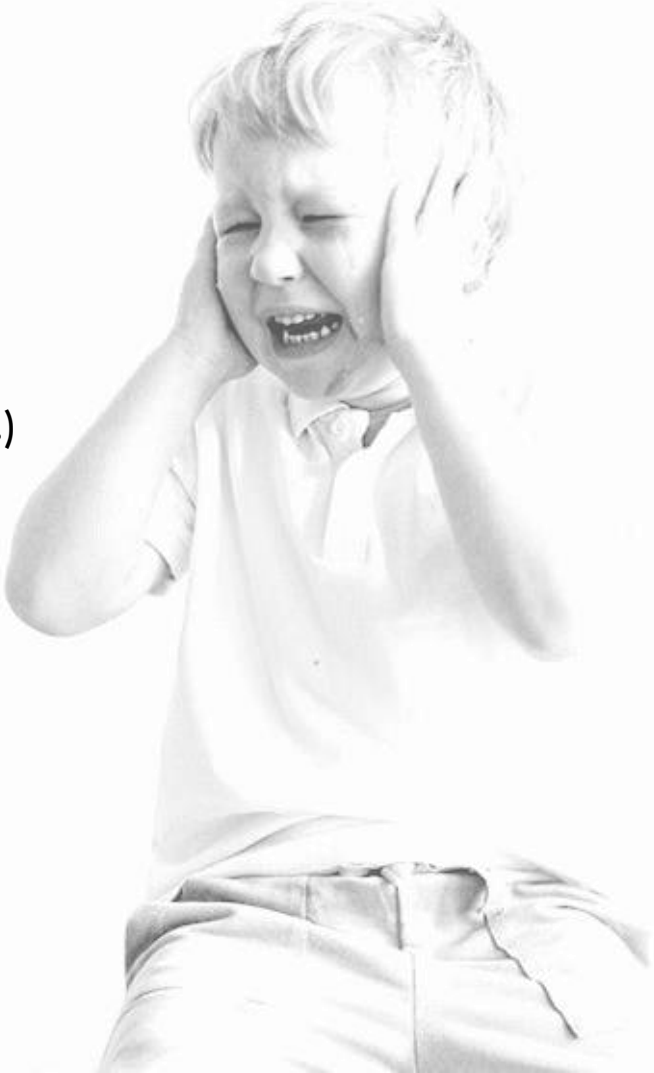
WHAT'S ON THE MIDTERM?

Chapters 1, 2, 3, 4, and 5

WHAT'S ON THE MIDTERM?

Chapter 1

- Nature of software systems
- Understanding of the definition of "software engineering"
- Stakeholders in software engineering
- Different perspectives of software quality (e.g., usability, efficiency, reliability, etc.)
- Types of software engineering projects
- Activities common to software projects



WHAT'S ON THE MIDTERM?

Chapter 2

- Procedural and data abstraction
- Basics of the object oriented paradigm
- Classes and objects
- Naming classes
- Instance and class variables
- Methods, operations, and polymorphism (and dynamic binding)
- Inheritance (and the "isa" rule)
- Abstract classes and methods
- Overriding
- How a decision is made about which method to run in an inheritance hierarchy
- Basics of Java (characters and strings, ArrayList and Collection, casting, exceptions, interfaces, and access control)
- Threads and concurrency

WHAT'S ON THE MIDTERM?

Chapter 3

- Types of reusability
- Object oriented frameworks (hooks, slots, service methods)
- What is an API?
- Types of frameworks
- Distributed systems
- Client-server architecture
- Client-server sequence diagrams
- Client-server threads
- Types of clients in client-server systems
- Communication protocols
- TCP and IP protocols
- Sockets and input and output streams
- OCSF (creating a client, creating a server, and callbacks and service methods)
- SimpleChat application

WHAT'S ON THE MIDTERM?

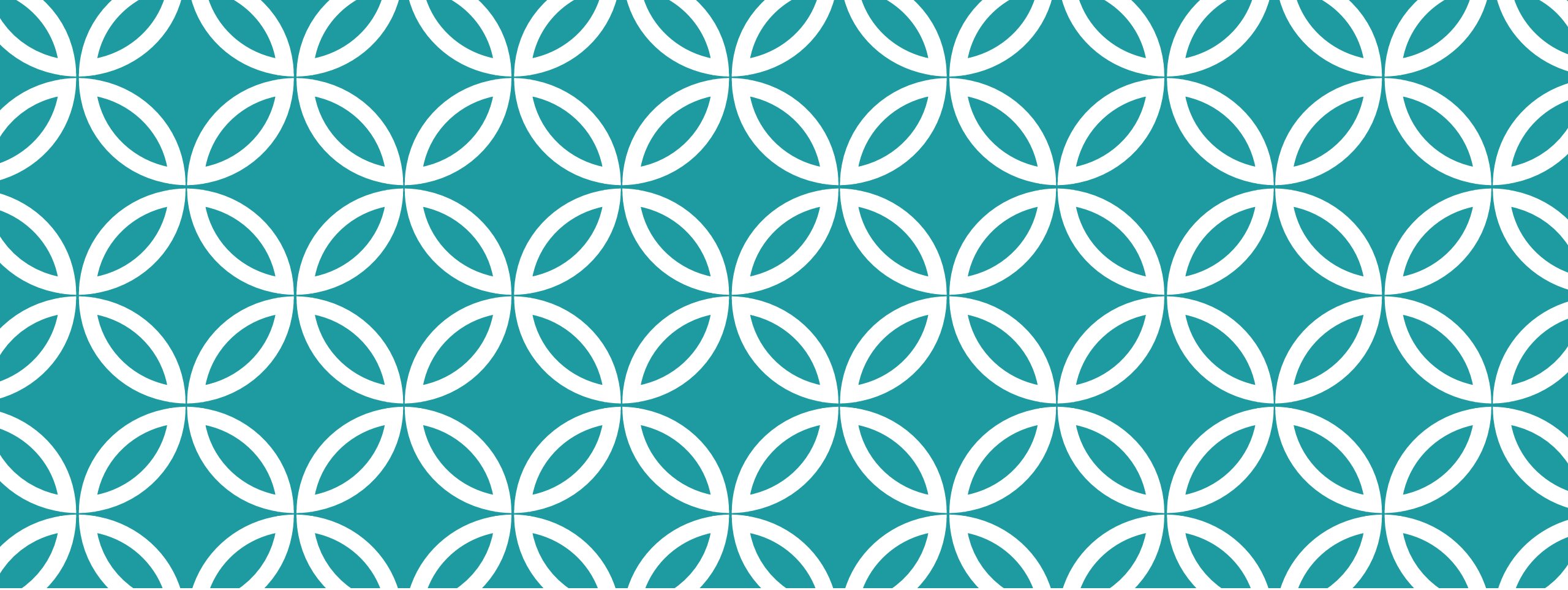
Chapter 4

- Domain analysis
- Defining the problem and the scope
- Functional requirements
- Quality requirements
- Use case descriptions
- Use case diagrams (extensions, generalizations, inclusions)
- Selecting the use cases on which to focus
- Benefits of use cases
- User stories vs use cases
- Gathering and analysing requirements (observation, interviewing, brainstorming, prototyping, use case analysis)
- Reviewing requirements
- Managing changing requirements

WHAT'S ON THE MIDTERM?

Chapter 5

- Types of UML diagrams
- Classes, associations, and multiplicity
- Association classes
- Reflexive associations
- Directionality of associations
- Generalization
- Handling multiple discriminators
- Avoiding unnecessary generalization
- Object diagrams
- Advanced UML class features: aggregation, aggregation hierarchy, composition, propagation
- Interfaces in UML class diagrams
- Types of UML class diagrams: exploratory domain model, system domain model, and system model
- Process of developing class diagrams (suggested sequence of activities)
- Identifying generalizations
- Allocating responsibilities to classes
- Implementing class diagrams in Java
- Basic idea of OCL



SAMPLE QUESTIONS

QUESTION 1

Which one of the following statements is true in regard to callback methods in a framework?

a) They are methods included in the framework and called by your code.

b) They are methods you implement in your code and are called by the framework.

c) They are private methods included in the framework and cannot be called by your code.

d) They are methods that must be called at least twice.

e) They are methods that are optionally implemented by your code.

QUESTION 1

Which one of the following statements is true in regard to callback methods in a framework?

a) They are methods included in the framework and called by your code.

b) **They are methods you implement in your code and are called by the framework.**

c) They are private methods included in the framework and cannot be called by your code.

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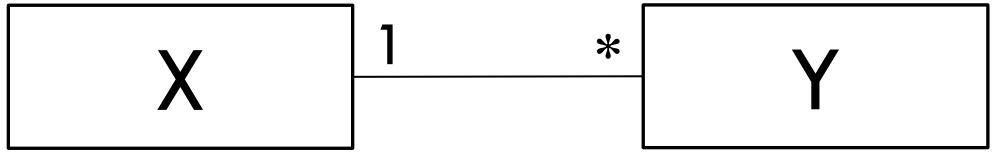
QUESTION 2

What best describes the association between classes X and Y?



a) A Y instance is associated with 0 or more X instances

b) A Y instance has a reference to an X instance; however, an X instance does not have a reference to a Y instance

c) An X instance is associated with 0 or more Y instances

d) An X instance is associated with 1 Y instance

e) None of the above

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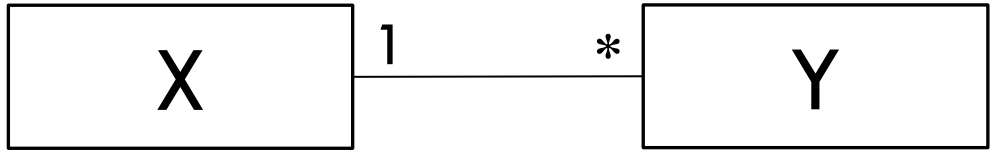

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QUESTION 3

Which of the following statements is true regarding the Java programming language?

a) A class cannot inherit protected methods from a superclass

b) You cannot extend abstract classes that contain concrete methods

c) You can extend multiple abstract classes

d) You can implement multiple interfaces

e) None of the above

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Which of the following statements is true regarding the Java programming language?

a) A class cannot inherit protected methods from a superclass

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QUESTION 4

Which of the following statements is true about interfaces in Java?

a) An interface can only extend other interfaces

b) You can create an instance of an interface

c) You can define non-static concrete methods in an interface

d) You cannot declare static variables in an interface

QUESTION 4

Which of the following statements is true about interfaces in Java?

a) **An interface can only extend other interfaces**

b) You can create an instance of an interface

c) You can define concrete methods in an interface

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QUESTION 5

Consider a client-server system, where an administrator interacts with the user interface of the server. Two clients are connected to the server. At least how many threads must be running on the server?

a) 1

b) 2

c) 3

d) 4

e) More than 4

QUESTION 5

Consider a client-server system, where an administrator interacts with the user interface of the server. Two clients are connected to the server. At least how many threads must be running on the server?

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c) 3

d) 4

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QUESTION 6

Which one of the following statements is true regarding the UML Class diagram shown below? To answer, suppose that only one X instance exists in memory.

a) If the X instance is deleted, then all Y instances must be deleted

b) If all Y instances are deleted, then the X instance must be deleted

c) If all Z instances are deleted, then all Y instances must be deleted

d) If the X instance is deleted, then all Z instances must be deleted

e) None of the above

QUESTION 6

Which one of the following statements is true regarding the UML Class diagram shown below? To answer, suppose that only one X instance exists in memory.

a) **If the X instance is deleted, then all Y instances must be deleted**

b) If all Y instances are deleted, then the X instance must be deleted

c) If all Z instances are deleted, then all Y instances must be deleted

d) If the X instance is deleted, then all Z instances must be deleted

e) None of the above

QUESTION 7

Given the UML diagram, which one of the following statements is true?

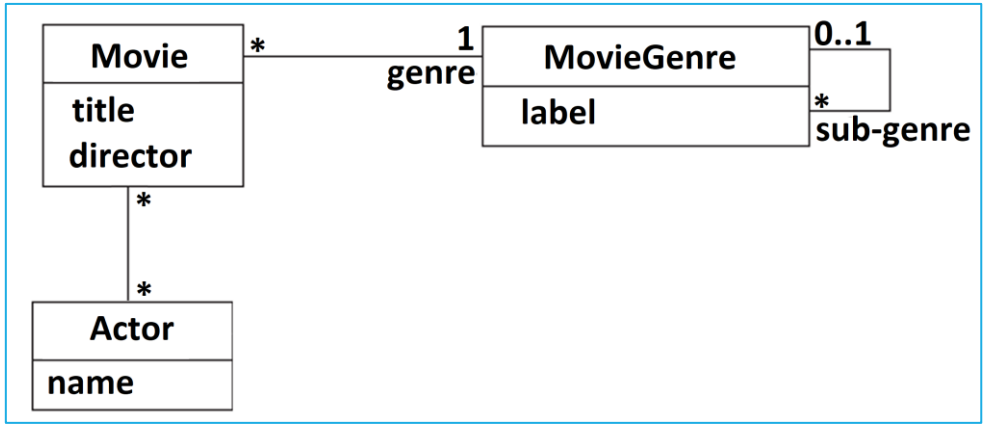
a) A Movie can have multiple directors

b) A sub-genre cannot have its own sub-genres

c) Each MovieGenre has one to many sub-genres

d) A Movie can have multiple MovieGenres

e) None of the above



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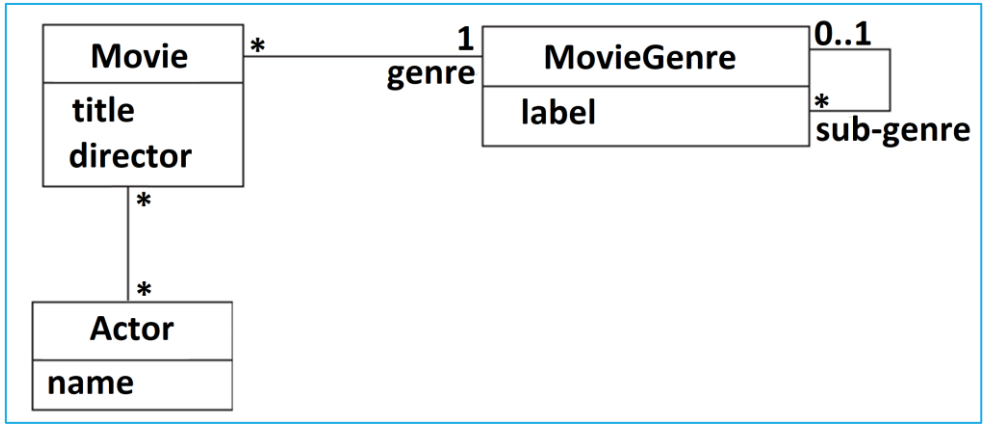
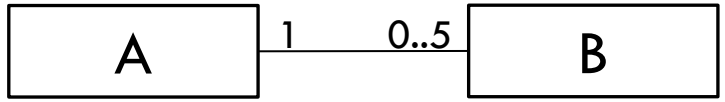


QUESTION 8

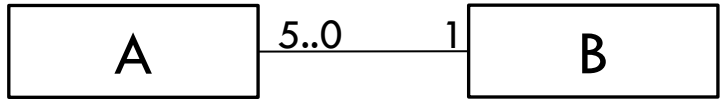
Consider this code. Which one of the following UML class diagrams best corresponds to the code?

Note: For a List, method *indexOf(e)* returns the index of e in the list, or -1 if this list does not contain e.

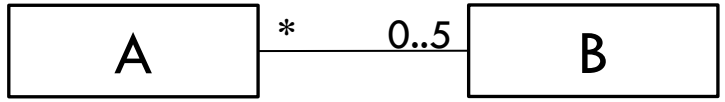
a)



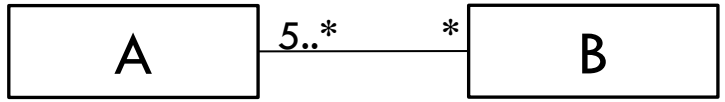
b)



c)



d)



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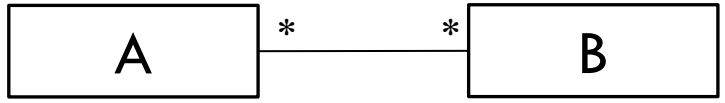


```
class A {
  private List<B> bList;
  private int limit = 5;
  ...
  public boolean addLink(B b){
    if(bList.size() < limit){
      if (bList.indexOf(b)==-1)
        b.addA(this);
        return true;
      }
    }
    return false;
  }
  ...
}

class B {
  private List<A> aList;
  ...
  public boolean createAssociation(A a){
    if(aList.indexOf(a)==-1)
      if (a.addLink(this)){
        aList.add(a);
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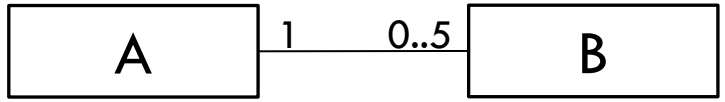

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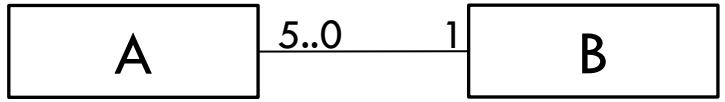

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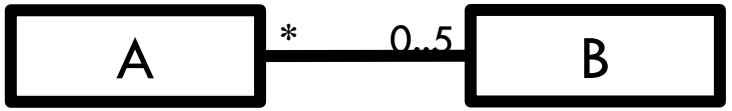

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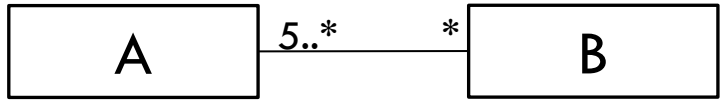

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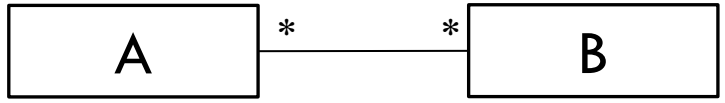


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  ...
}
```

QUESTION 9

Given the UML diagram, which one of the following statements is true?

a) The Bicycle class should not contain the `break()` method as it is defined by its parent class

b) You can call the method `getNumberOfDoors()` on a MotorVehicle object as this operation is defined in its subclass

c) The following line of code causes a compilation error:
```
MotorBike mb = new Vehicle();
```

d) The following line of code causes a compilation error:
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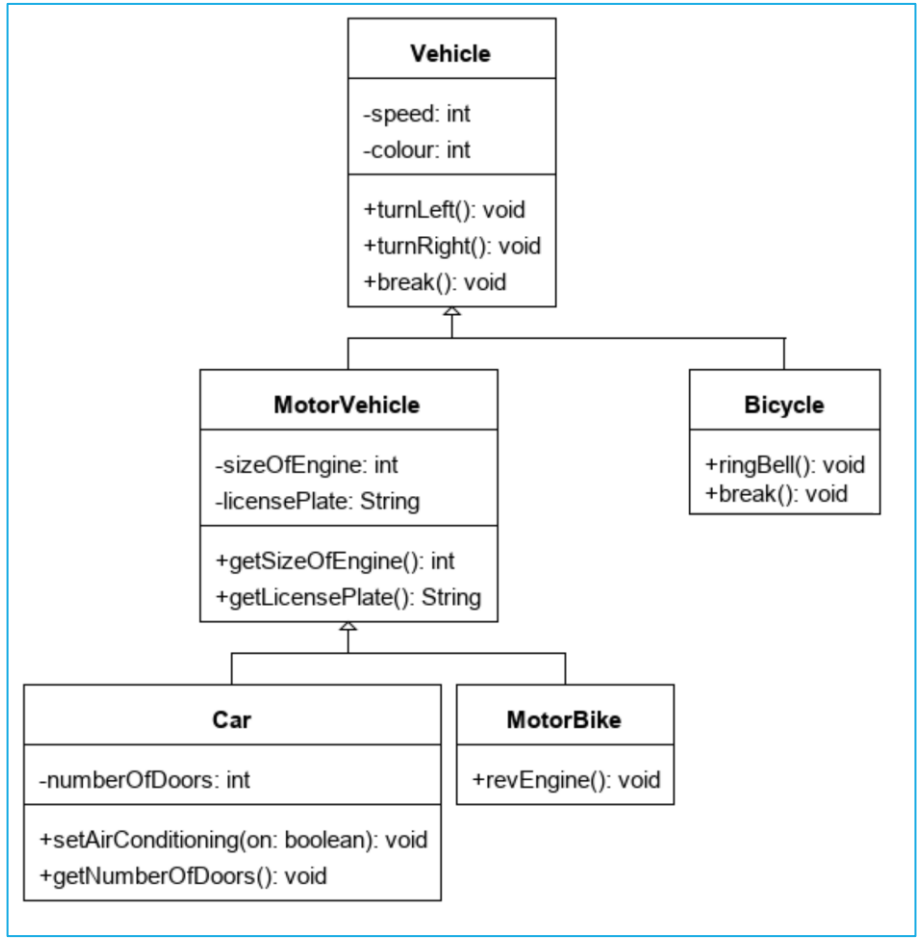
Vehicle mb = new MotorBike();
```

e) None of the above



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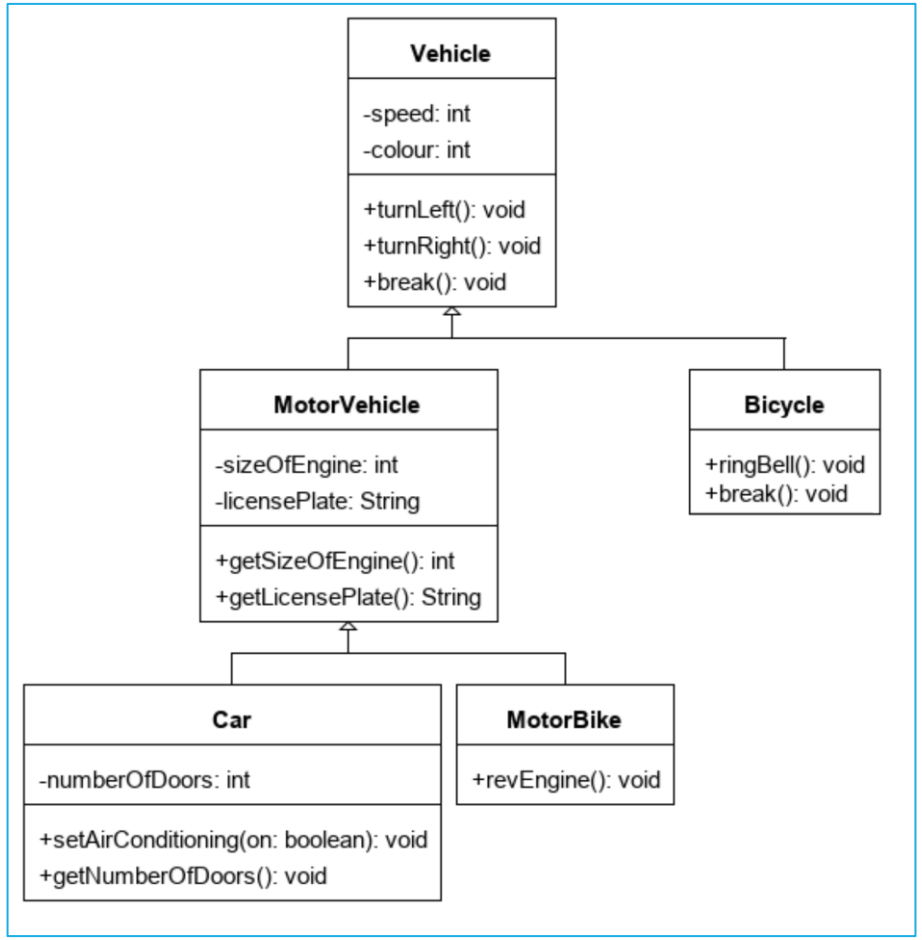


QUESTION 10

Given the UML diagram and code, which one of the following statements is true?

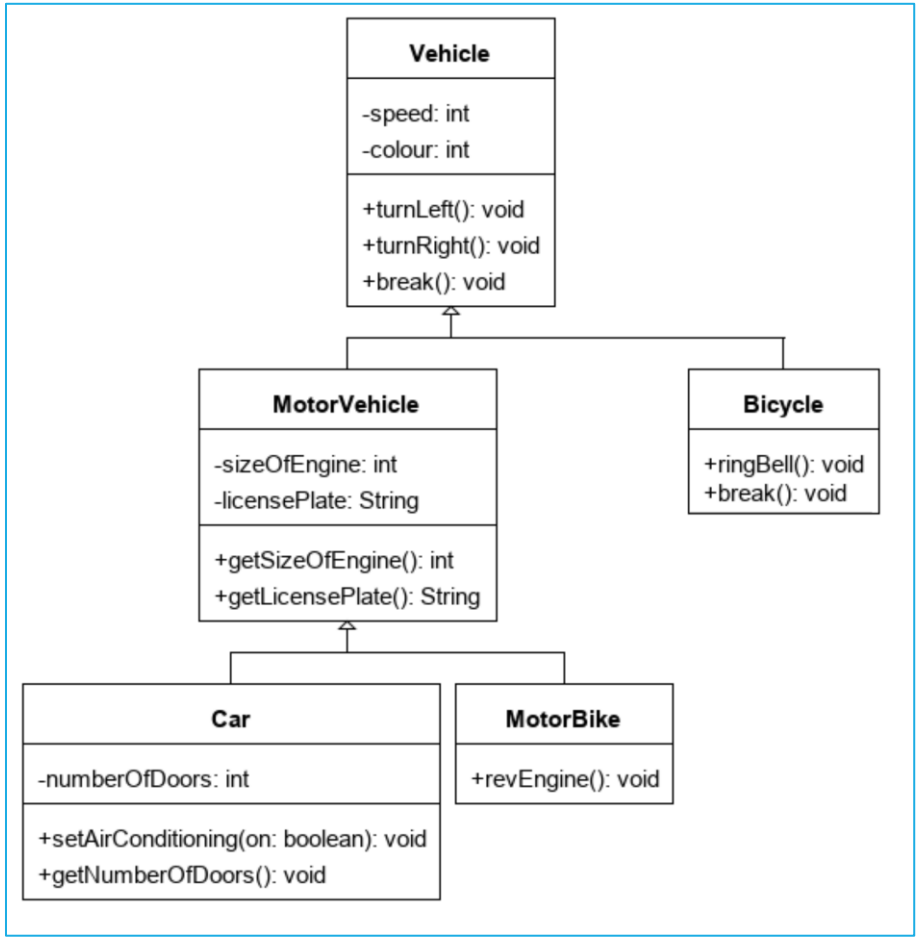
a) The call `b.break()` executes the `break()` method that belongs to the Vehicle class

b) The call `mb.break()` cannot be made as the class MotorBike does not define the `break()` method

c) The Bicycle class inherits the `speed` and `colour` attributes

d) The call `b.ringBell()` causes a compilation error

e) None of the above




```
…
Vehicle b;
Vehicle mb;
b = new Bicycle();
mb = new MotorBike();
b.break();
mb.break();
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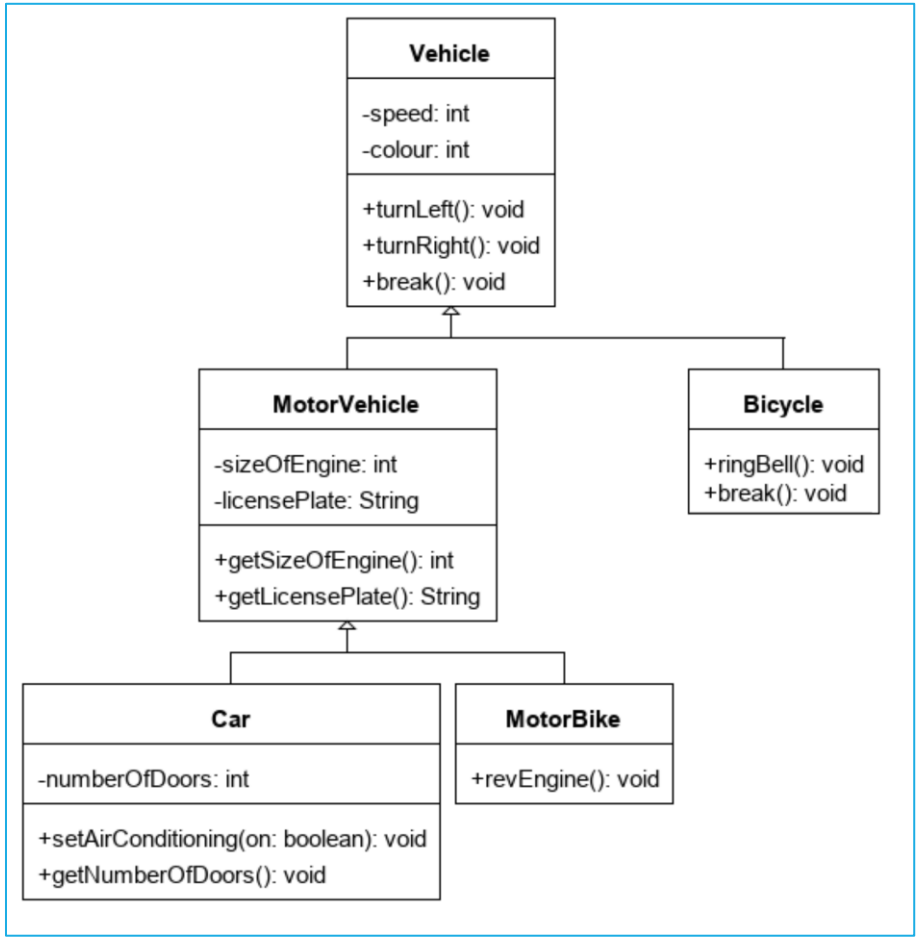


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