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1. The first stage of the two-stage design process is _____ design. 1 / 1 point

Hint: This stage has activities like creating CRC cards, talking with the customer about their requirements, and creating mockups.

conceptual

Correct
The correct answer is concept or conceptual design. This is the stage before technical design, where you will solicit customer requirements and use this to create a working conceptual design, using mockups and other early design techniques.

2. The second stage of the two-stage design process is _____ design. 1 / 1 point

Hint: This is when you will define the structure of the code and start turning your mockups into classes.

technical

Correct

The correct answer is technical design. This is the stage at which the developers will start to turn the conceptual design into a more precise technical design. They could do this by using the UML design language, by specifying which methods will be coded for each class, etc.

3. Which of these conceptual design techniques will help you analyze the problem space to determine classes for your object-oriented software? Choose the two correct answers. 1 / 1 point

- [ ] requirements
- [ ] tradeoffs
- [x] CRC

Correct

Correct. CRC Cards will help you identify classes.

- [x] mockups

Correct

Correct. Mockups will help you visualize your problem space in the earliest stages.

4. During conceptual design, once the problem is mapped into components, what are the other two critical pieces of information that you must specify for these classes or components? Choose the two correct answers. 1 / 1 point

- [ ] methods
- [ ] abstract data types
- [x] collaborators

Correct

Correct. Collaborators are other pieces of the software that your component will interact with to fulfill its function!

- [x] responsibilities

Correct

Correct. Responsibilities are what the component will do or keep track of.

5. 1 / 1 point

You are writing the CRC card for a Bear component. Choose the two responsibilities.

- [x] eat berries

Correct
Correct. Eat berries is something bears are known to do.

- [ ] camper
- [x] hunger

Correct
Correct. Hunger is not as obvious because it does not have a verb, but you can think of it like this: the bear component needs to keep track of its hunger.

- [ ] den

6. 1 / 1 point

You are writing the CRC card for a Bear component. Choose the three collaborators.

- [ ] guitar
- [x] den

  Correct

  Correct. A den is a component a bear may interact with.

- [x] tree

  Correct
  Correct. A tree is a component that a bear may interact with.

- [x] bear

  Correct

  Correct. Objects can and often do interact with other objects of their class!

- [ ] computer

7. You create an object that represents a user, storing important information about them such as their preferences. What kind of object is this? 1 / 1 point

- ○ client
- ○ control
- ◉ entity
- ○ boundary

  Correct
  Correct! Entity objects often represent real-world objects.

8. You create an object that represents a dialog box. It creates buttons and text fields, etc, for the user to interact with, and it logs those interactions. What kind of object is this? 1 / 1 point

- ◉ boundary

- display
- interaction
- entity
- control

Correct
Correct! This is a boundary object, because it interfaces with another system (the user)

9. You create an object that compares values from two different sources. It then updates the smaller value to be equal to the larger one. What kind of object is this? 1 / 1 point

- control
- repository
- update
- entity

Correct
Correct! This is a control object, because it coordinates the activities of other objects.

10. Which of these is an example of a quality tradeoff? 1 / 1 point

- Adding security knowing it will reduce speed
- Adding preferences that allow users to switch some features on and off
- Not delivering key features so that deadlines can be met
- Limiting features knowing that they can be added later

Correct
Correct. A tradeoff happens when to make an improvement you must sacrifice some other quality.

11. What is the term for reducing a class or object to its inputs and outputs in modelling? 1 / 1 point

- black box thinking
- pipe thinking
- filter thinking
- process thinking

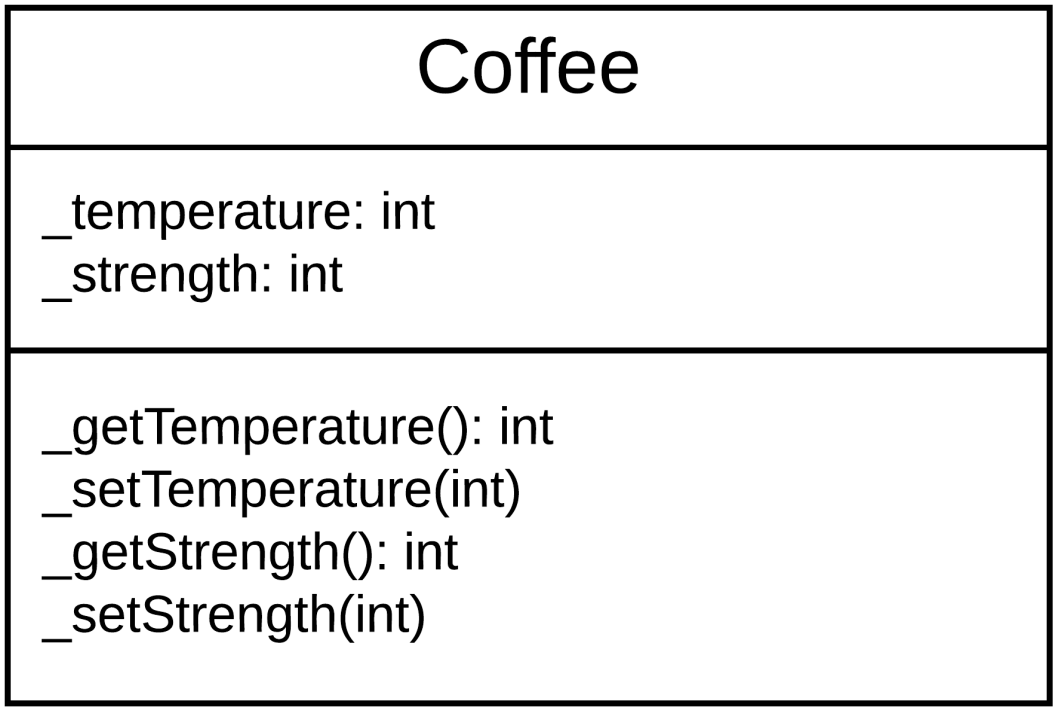
Correct
Correct! This is called black box thinking, because you don't care what happens inside at this point, only the inputs and outputs.

12. Which one of these classes is in most need of being decomposed? 1 / 1 point

- Book
- Store
- Student
- Order

Correct
Correct! A store has lots of responsibilities, including tracking orders, inventory, employees, customers, etc. This class needs to be decomposed.

13. In order to provide good encapsulation, fill-in-the-blanks on this UML class diagram: (Replace the underscores _ from top to bottom with minus signs ("-") or plus signs ("+"); your answer will be a string of six + or - signs with no spaces) 1 / 1 point

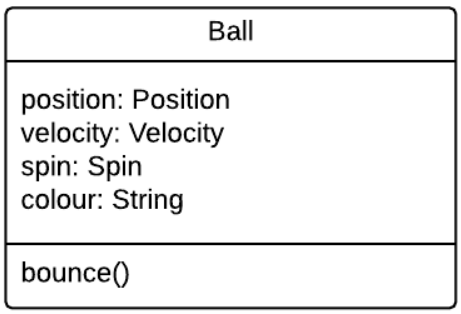


--++++

Correct
The correct answer is "--++++". In other words, the variables are declared private so they cannot be seen or changed from outside the class. Instead, getter and setter methods are specified.

14. You are writing a simple soccer video game. Select the best example of proper abstraction: 1 / 1 point

a)



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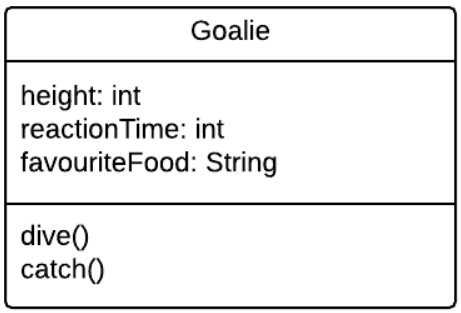
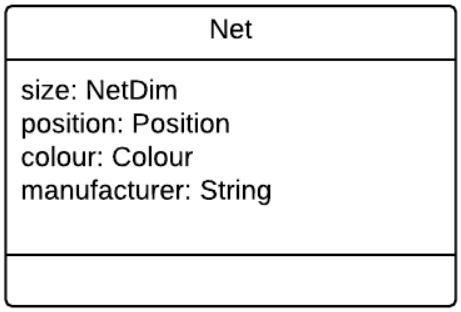
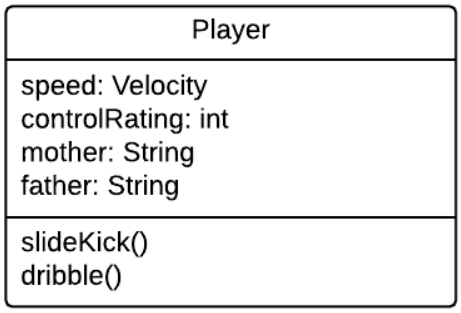


c)



d)



- [x] a)
- [ ] b)
- [ ] c)
- [ ] d)

Correct
Correct! This class contains only details that are important in the context (a soccer video game).

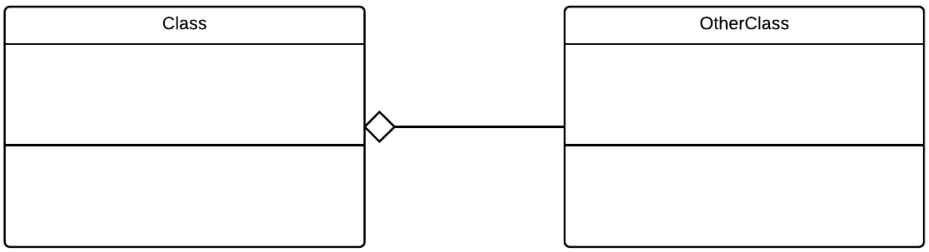
15. Which design principle enables developers to follow the guideline D.R.Y. ("Don't Repeat Yourself"): 1 / 1 point

- abstraction
- generalization
- encapsulation
- decomposition

Correct
Correct! Generalization (along with other object-oriented tools) allows developers to follow the D.R.Y. principle!

16. Which of these UML class diagrams shows an association relationship? 1 / 1 point

a)



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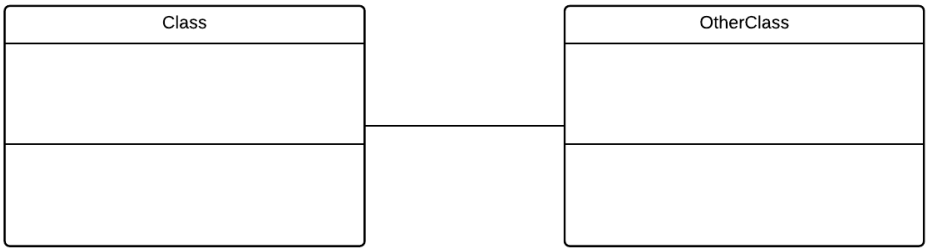
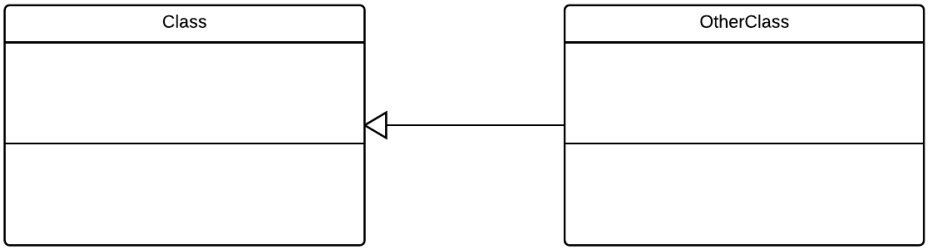


c)



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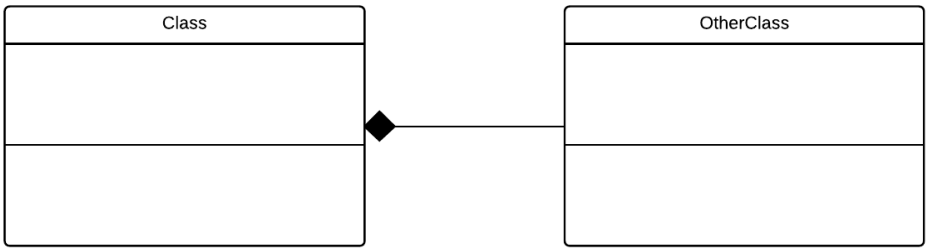


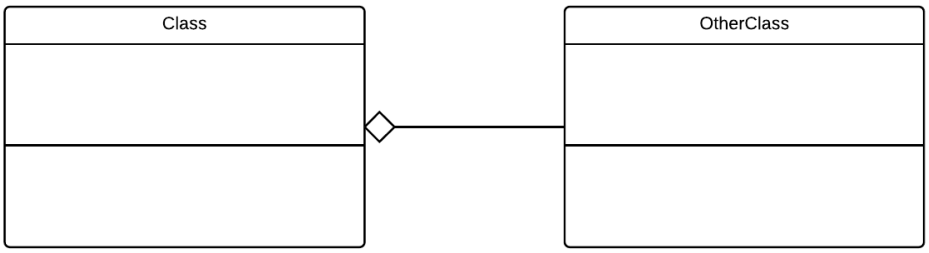
- a)

- b)
- c)
- d)

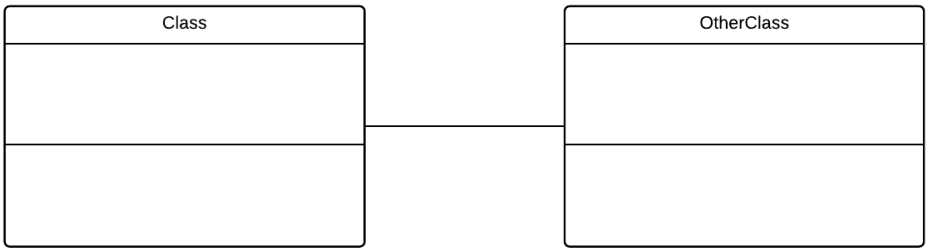
Correct
Correct! A simple association relationship is shown with a plain line, often with numbers indicating how many of each object can be associated.

17. Which of these UML class diagrams depicts an aggregation ("has-a") relationship between the two classes? 1 / 1 point

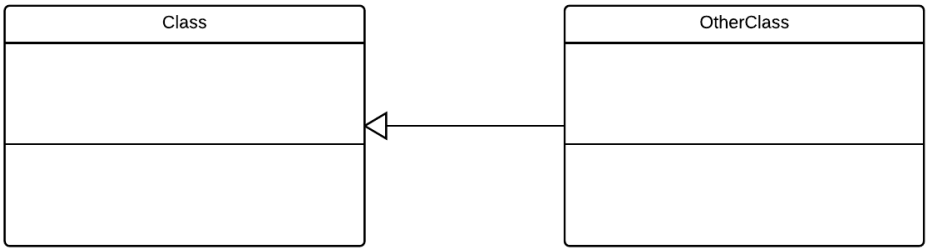
a)



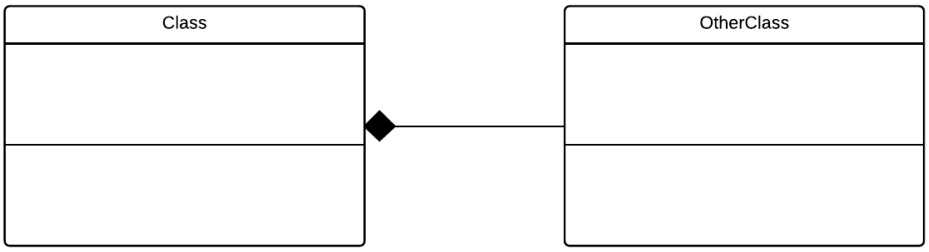
b)



c)



d)

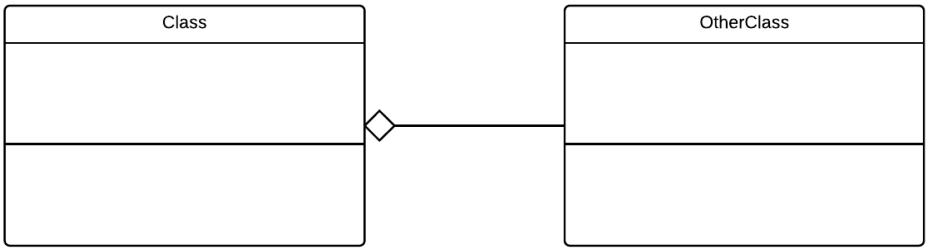


- a)
- b)
- c)
- d)

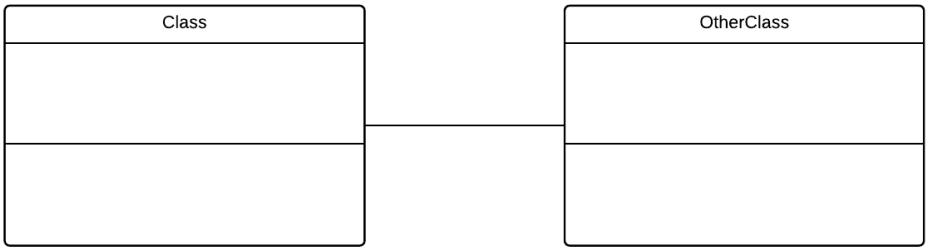
Correct
Correct! An open diamond indicates a weak "has a" or aggregation relationship.

18. Which of these UML class diagrams depicts a composition, or a strong "has-a" relationship? 1 / 1 point

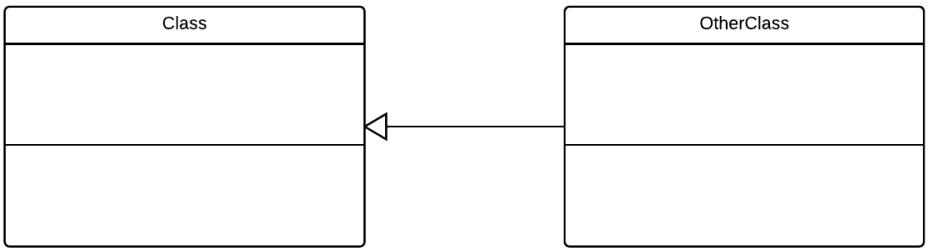
a)



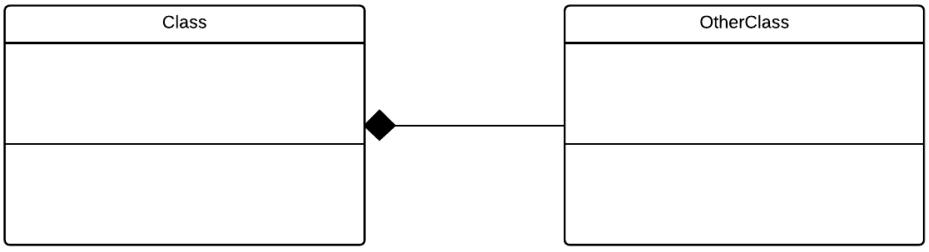
b)



c)



d)



- ○ a)
- ○ b)
- ○ c)
- ◉ d)

Correct

Correct! A filled diamond indicates a composition - or strong "has a" - relationship.

19. Select the object pairing that has an association relationship: 1 / 1 point

- Tree - Root
- Hiker - Trail
- Coffee - Water
- Book - Page

Correct
Correct! The hiker and trailer are associated but not dependent on each other.

20. Select the object pairing that has an aggregation relationship: 1 / 1 point

- Car - Road
- Book - Page
- Stapler - Staple
- Pie - Crust

Correct
Correct! the stapler and staples can exist independently but usually the stapler aggregates staples.

21. Select the object pairing that has a composition relationship: 1 / 1 point

- Tea - Sugar
- Book - Page
- Record Player- Record -
- Bear - Forest

Correct
Correct. A book must have pages!

22. Choose the two answers that correctly complete the following sentence: 1 / 1 point

"We say that a class has low cohesion if..."

- [ ] ...connects to many other classes.
- [x] ...its purpose is unclear.

Correct
Correct. Cohesion is how well a class is directed toward a clear, singular purpose.

- [x] ...it tries to encapsulate too many unrelated responsibilities.

Correct
Correct. Cohesion is the degree to which a class is directed toward one purpose. Giving it unrelated responsibilities reduces cohesion.

- [ ] ...it does not have all the necessary parts, i.e. it is incomplete.

23. Two classes are tightly coupled. What are some ways you might be able to tell? Choose the two correct answers. 1 / 1 point

- [ ] They can easily be swapped with different implementations of the same class
- [ ] Their interactions are limited and controlled
- [x] In order to understand one class, you need to open up the other to look at the implementation

Correct
Correct. This is usually a sign that the coupling is too tight; instead, the interfaces should be clear and interactions limited.

- [x] They are very highly reliant on each other

Correct
Correct. Coupling refers to how deeply integrated different components are. Tight coupling means the components are deeply integrated, which is not desirable because it makes it more difficult to make changes.

24. How can you apply the principle of Separation of Concerns in object-oriented programming? 1 / 1 point

- ○ Ensure classes are only concerned with their own data
- ◉ Separate objects or components according to their role in the software
- ○ Separate data and actions (methods) into different classes
- ○ Split developers into teams that each deal with different parts of the software

Correct
Correct! Each object or component should have a fairly specific role or concern in the software which is separate from the concerns of other objects.

25. Which of these violates Liskov's Substitution Principle? 1 / 1 point

- subclasses specify the abstract methods of the superclass
- the subclass adds behaviour
- an operation in the superclass is replaced by a different operation in the subclass
- the superclass is too general

Correct
Correct! This directly violates Liskov's substitution principle, which is a useful test to identify poor uses of inheritance.

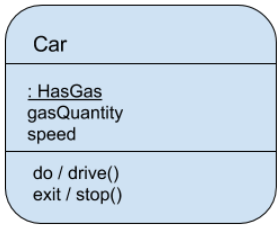
26. For which of these situations would you use a sequence diagram? 1 / 1 point

- To show all of the different processes of your program.
- To show the collaborative behaviour of objects in your program.
- To show the different modes that your program can be in.
- To show the relationship between classes

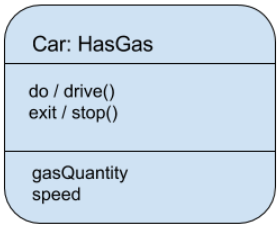
Correct
Correct! This is the best use of a sequence diagram.

27. Choose the correct state diagram for a car which has a state called "HasGas:" 1 / 1 point

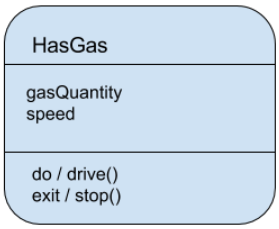
a)



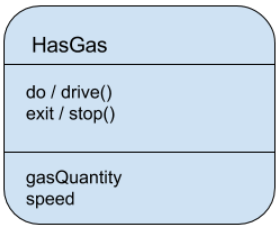
b)



c)



d)



- ○ a)
- ○ b)
- ◉ c)
- ○ d)

✓ Correct
Correct! The state goes at the top, variables in the middle, and activities (including exit and entry activities) in the bottom.

28. Which of these elements represents a termination in a UML State diagram? 1 / 1 point

a) 

b) 

c) 

d) 

- (●) a)
- ( ) b)
- ( ) c)
- ( ) d)

✓ Correct
Correct! This represents a termination

29. What is the purpose of model checking? 1 / 1 point

- ( ) To verify that the technical implementation matches conceptual mockups
- ( ) To test for user-reported bugs
- ( ) To verify that the conceptual model of your software matches the customer's requirements.
- (●) To check the software for errors before release

✓ Correct
Correct! this is the point of Model Checking.

30. What is an abstract data type? 1 / 1 point

- (●) a type of data defined by the developer rather than the language.
- ( ) variables that are assigned a type (i.e. integer, double) but does not yet have a value assigned.
- ( ) a data-centric class
- ( ) a data type that cannot be used directly but must be implemented as an interface

✓ Correct
Correct! Abstract data types are structured by the developer. They eventually evolved into classes.