

ClassActivity_9

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Please **write/type up your solutions** for the following questions and **submit as a pdf file**.

Q1. What is UML used for?

UML is used to help us communicate the design and visualize the relationship between different parts of a program.

Q2. Consider the following relationships. Explain whether each is an association, composition, or inheritance.

a) A dog is a kind of pet.

Inheritance. A dog inherits the general properties of a pet and has an is-a relationship with pet.

b) A dog owner feeds the dog.

Association. Dog owner and dog have a working relationship (feeding). This is association.

c) The dog has a tail.

Aggregation. Dog and tail form a has-a relationship. This could also be composition if there are multiple tailed-animals within the program, then the object (tail) is not exclusively owned by the aggregate object (dog).

Q3. Draw the class diagram for the following python code:

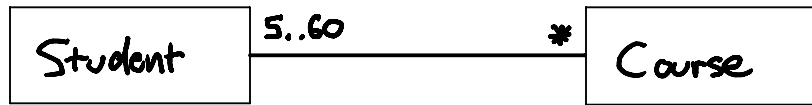
```
class BMI:
    def __init__(self, weight, height):
        self.weight = weight
        self.height = height

    def getBMI(self) -> float:
        bmi = self.weight / (self.height ** 2)
        return round(bmi * 100) / 100

    def getStatus(self) -> str:
        bmi = self.getBMI()
        status = "Obese"
        if bmi < 18.5:
            status = "Underweight"
        elif bmi < 25:
            status = "Normal"
        elif bmi < 30:
            status = "Overweight"
        return status
```

BMI
weight: float height: float
__init__(weight: float, height: float) getBMI():float getStatus(): str

Q4. Consider a **Student** class and a **Course** class. A student may take any number of courses; and a course may have from five to sixty students. Draw the class diagram, showing the association between the two classes.



Q5. State and explain two UML approaches for interactions modeling.

- Use case
- Sequence

Use case diagrams are used to model interaction between a system and external agent (such as a user) by describing a function the system performs to achieve the goals of the user.

Sequence diagrams illustrate the interaction between the sequence of messages between the objects actors and the objects of the system, and the interactions between the objects themselves.