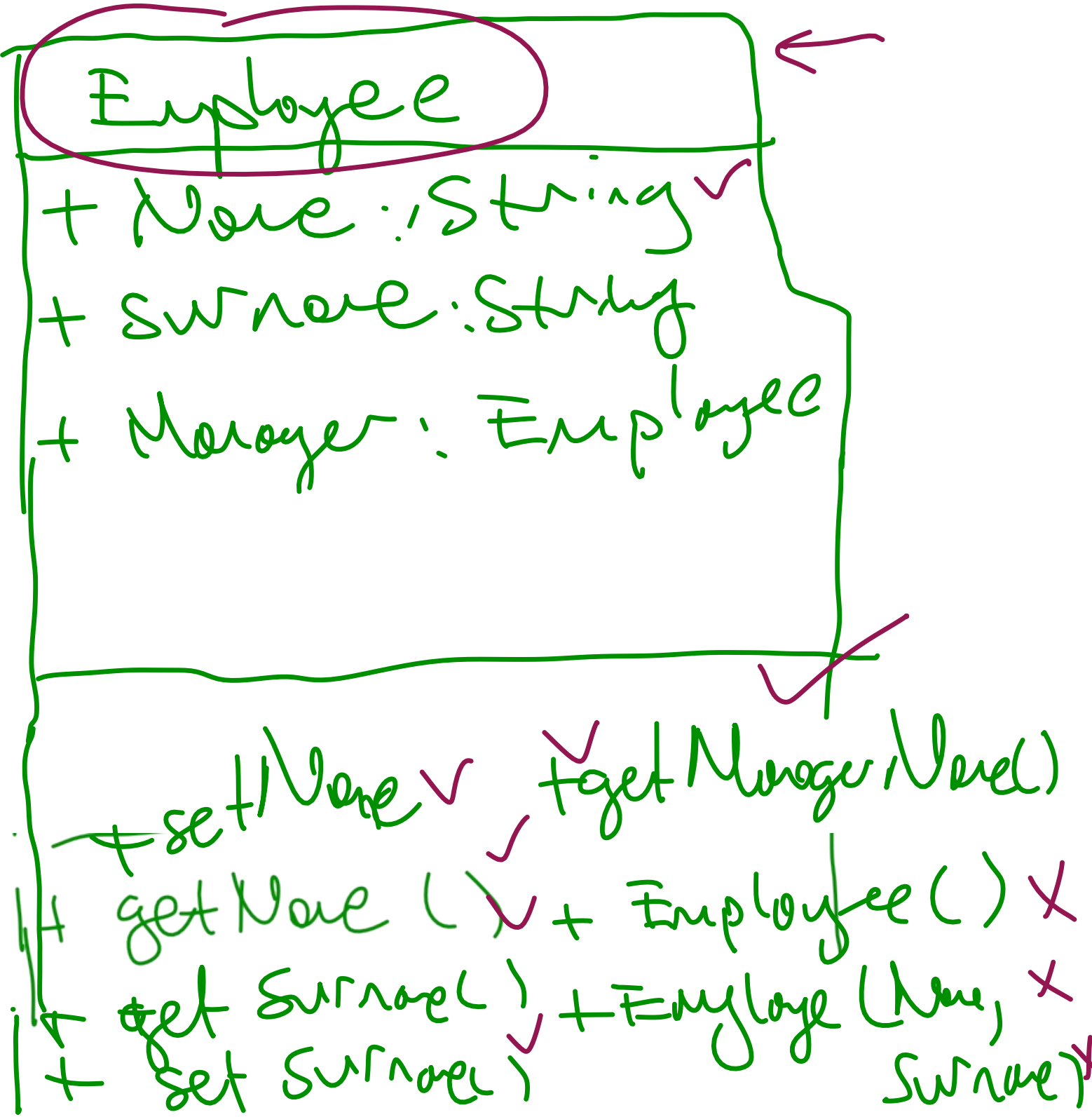
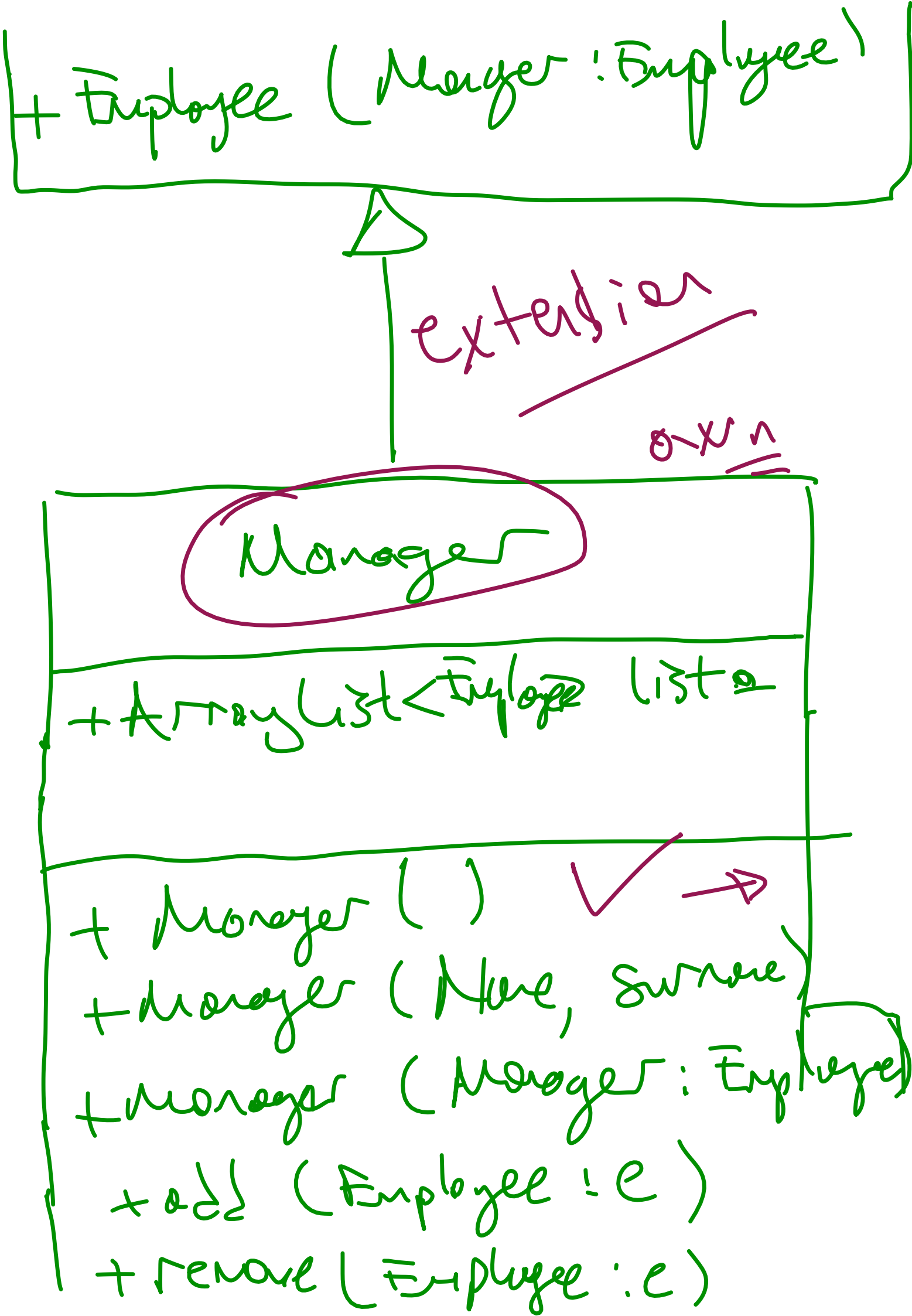
S.1 In an enterprise you are given a responsibility to give an Object Oriented model the managers and emloyees.

a) A manager is an employee
b) Every employee must have at least one Manager except the owner of the enterprise
c) A manager may have some employees to manage
d) Every employee can say the name of himself and Also Manager's Name
e) Manager of the Employee MAY be assigned at Constructor
f) Name & Surname of the Employee MAY be assinged at Construction Time
g) New employee may be added to Manager's list of employees

- Identify classes and Draw UML class diagrams of the classes 10
- Write Necessary Codes for the classes (25)




+ Employee (Manager : Employee)
extension
own
Manager
+ ArrayList<Employee> list
+ Manager ( )
+ Manager (Name, Surname)
+ Manager (Manager : Employee)
+ add (Employee : e)
+ remove (Employee : e)

S.2 Design an Object Model for an **UNFAIR TEN** sided dice, Since it is UNFAIR each side has different probability. Probabilities are listed below.

- Dice can be ROLLED,
- Dice can TELL the Rolled Number
- Dice Will keep track a counter for each side for each Rolling. (Ex. how many times 3th Side of the dice is seen as rolled?)
- Dice Should keep track the number of times it has been Rolled. (Ex how many times Dice is rolled)
- Dice should give a Report about status of DİCE(see REPORT output example below)

Probabilities of the each Dice side is give below,

Side → Probability	
1→ 0.05	6→ 0.05
2→ 0.1	7→ 0.05
3→ 0.2	8→ 0.05
4→ 0.05	9→ 0.10
5→ 0.05	10→ 0.30

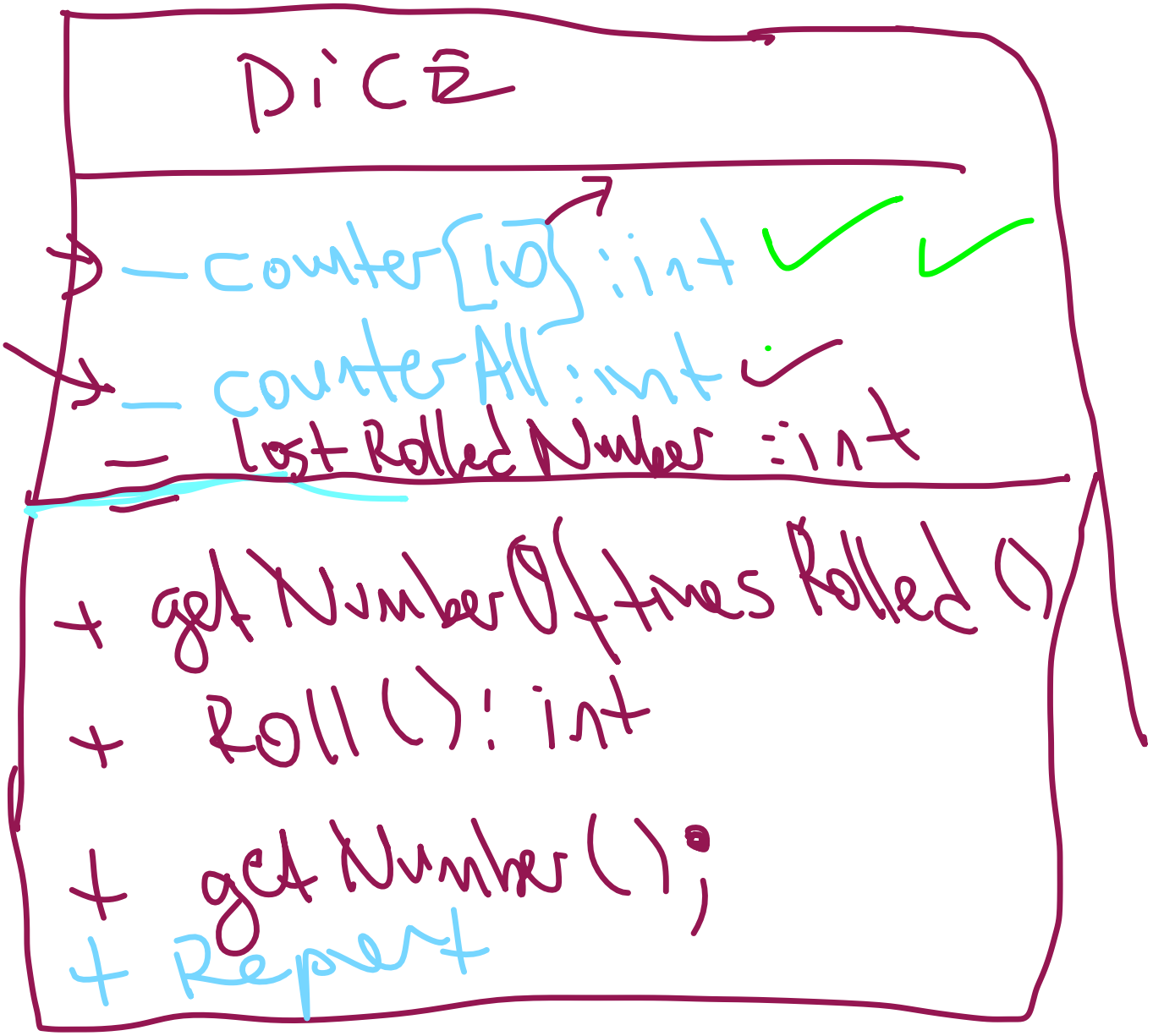
- Identify classes and Draw UML class diagrams of the classes 10
- Write Necessary Codes for the classes (35)

Example of Report (does not neccessary to be excatly same)

Dice has been Rolled 20 times

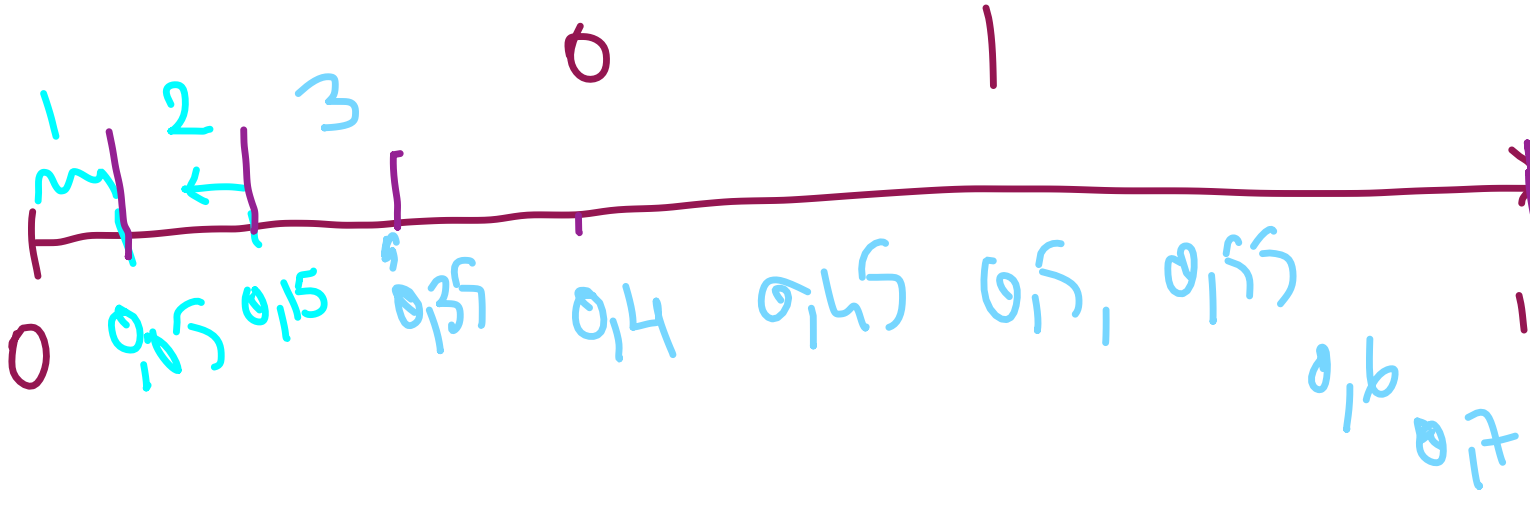
1: >2, 2: > 1, 3: > 2, 4: >2, 5: >2

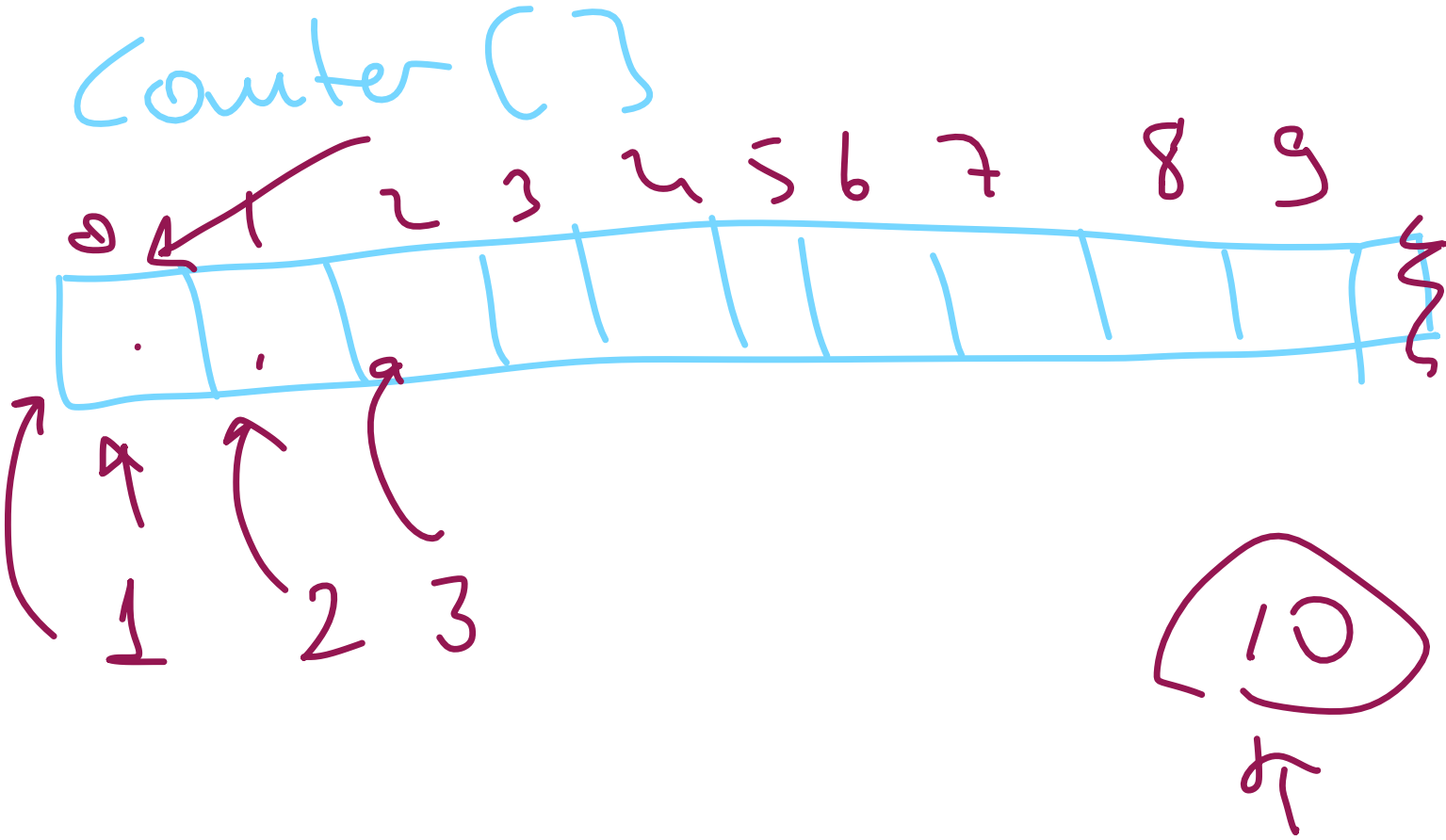
6: >1, 7: >0, 8: >1, 9: > 3, 10: >6



Create

Random





S.3 Prepare a Cirle Class that should has a **X** location, **Y** location and radii **R** as field. It should has a method called **doesIntersect (Circle c1, Circle c2) :boolean**

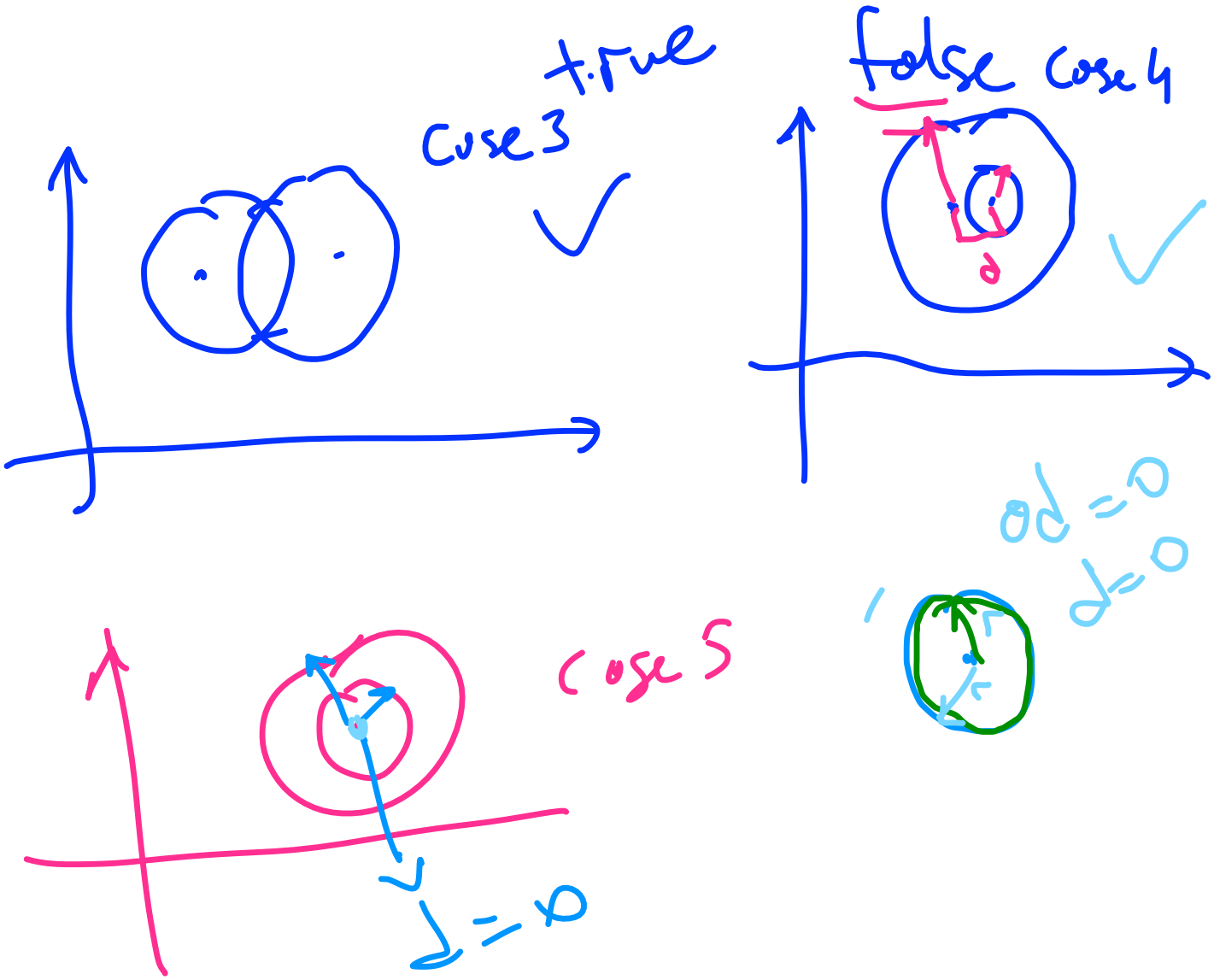
Prepare a class that informs whether there is an intersection of two circles whose center points are given coordinates ((x1, y1) (x2, y2)) and radii (r1, r2).

Distance between two circle is **d**, it is calculated as $d = \sqrt{(x1 - x2)^2 + (y1 - y2)^2}$

a) If **r1+r2 < d** no intersection.
b) Abstract difference **ad=|r1-r2| >d** then one circle is inside the other and no intersection
c) If **d=0** they have the same center and **ad=0** they intersect infinite number of locaitons

In any other cases this two cirle intersect in one or two location.

- Draw Circle UML class diagram 5
- Write necessary Codes for the Class 25



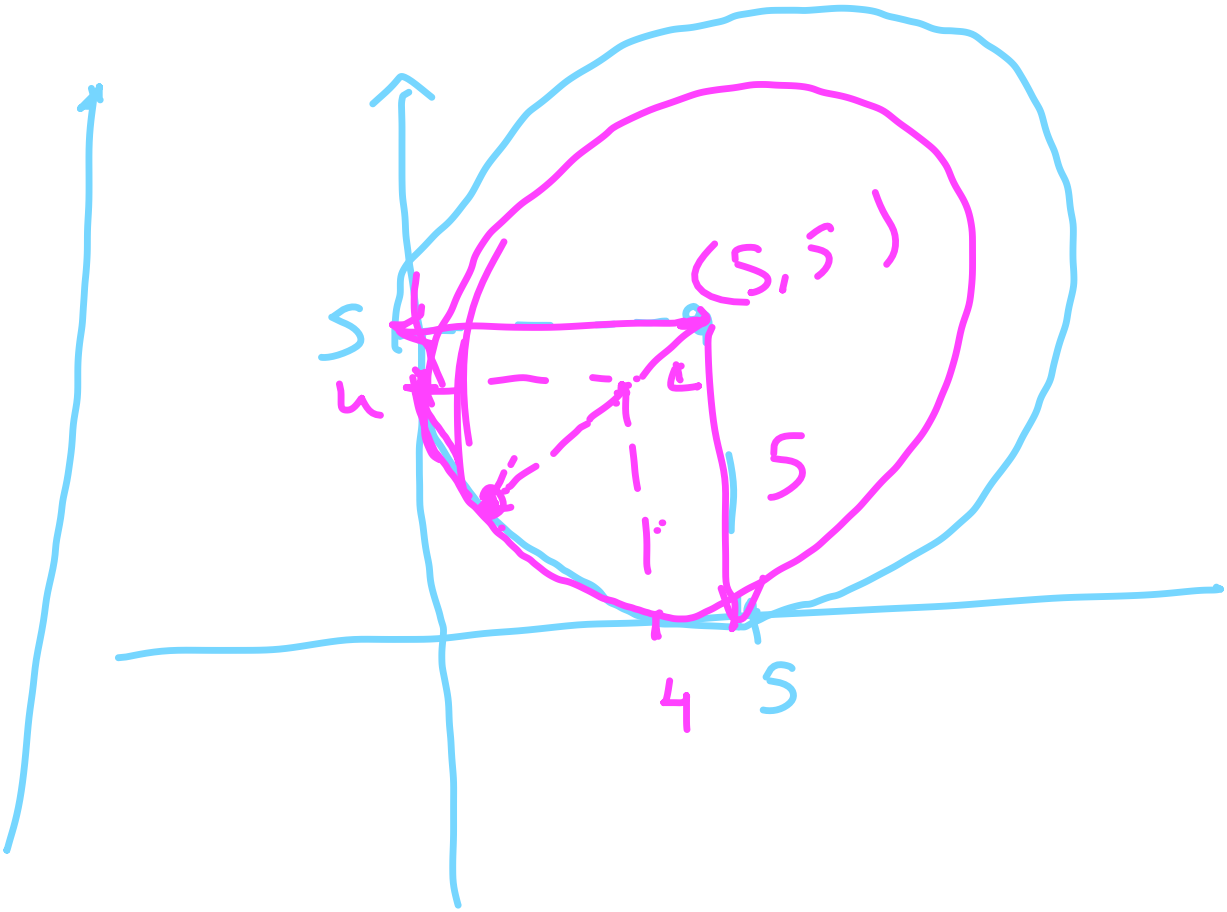
1 Class

Circle

- x : double
- y : double
- r : double
- od : double

d : double

+ doesIntersect (Circle c1, Circle c2) : boolean



Inheritance

2D

Square

Rectangle

Circle

a

a.a

a

b

a.b

3D

Cube

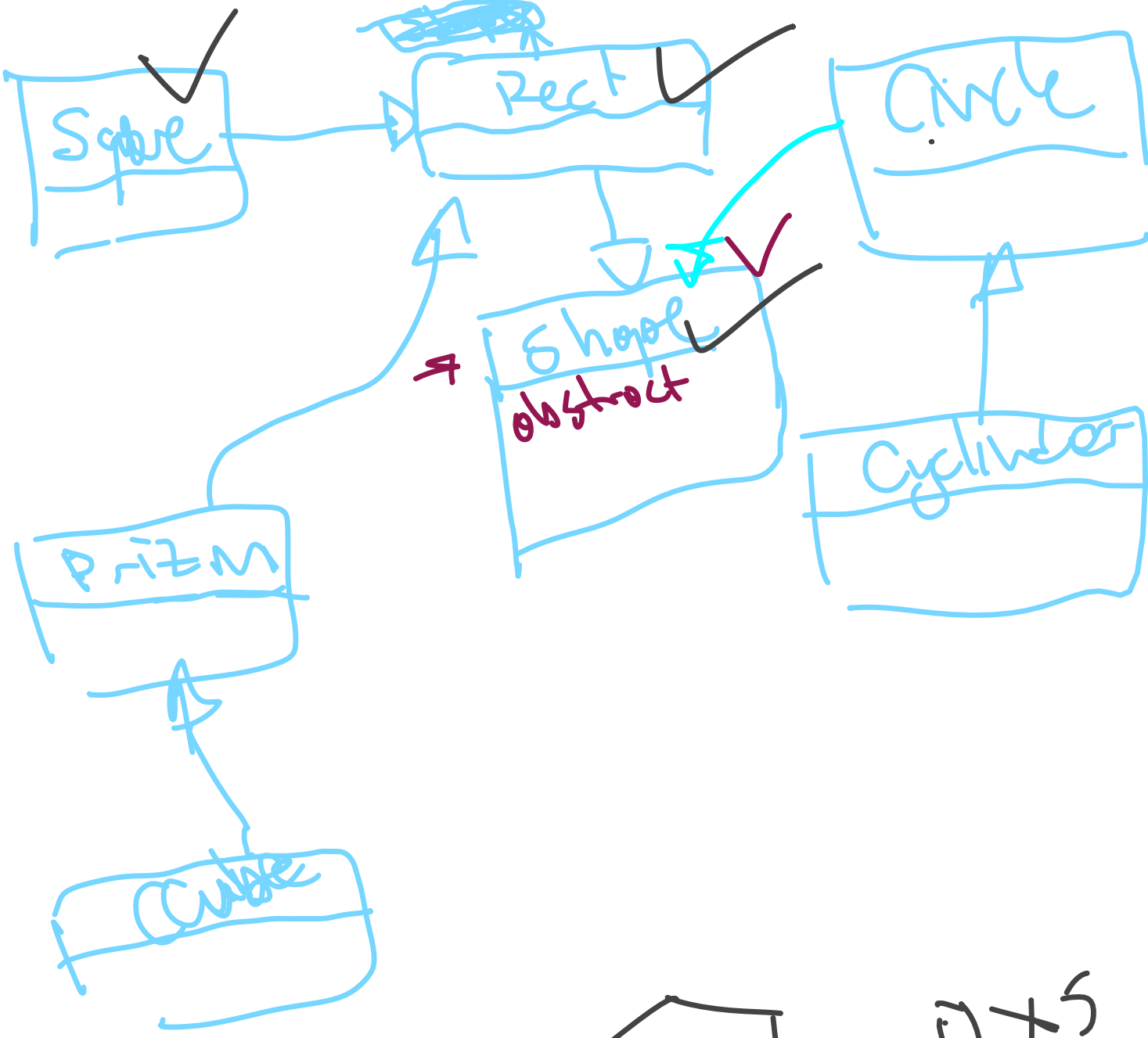
Prism

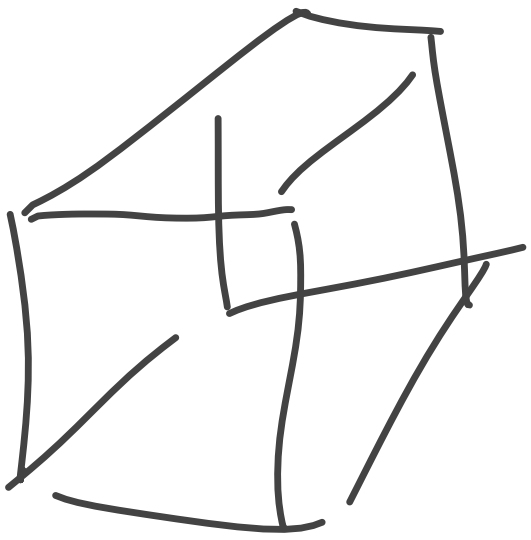
Cylinder

+ Area ✓

+ Perimeters ✓

+ Volume





nLx5

60