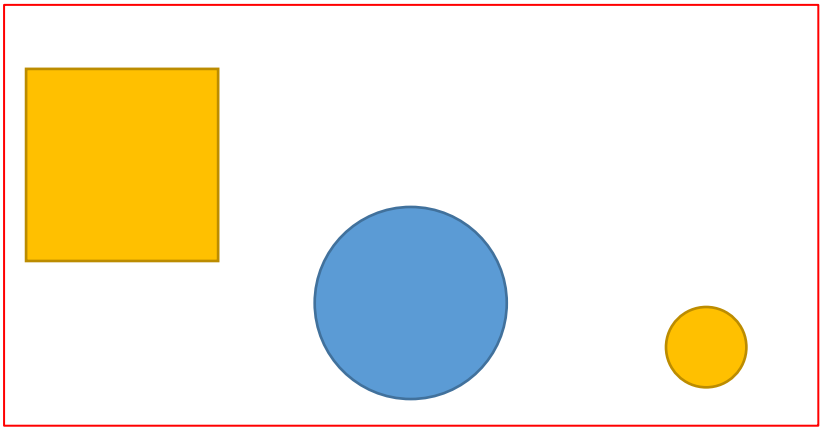
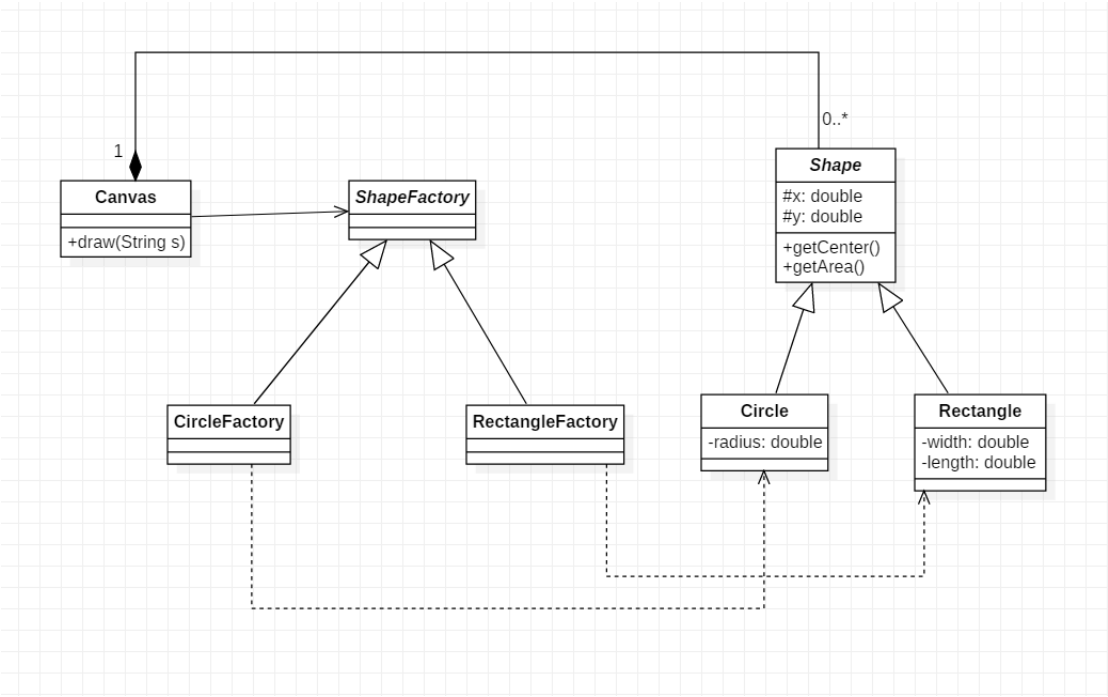


1. Consider the example in Assignment 1 (a canvas that can draw only circle and rectangle, disregarding Styles). Follow the Factory Method Pattern, draw a class diagram that include these classes: Shape, Circle, Rectangle, Canvas, as well as other classes necessary. Remember to include proper connections, and necessary attribute/method definitions in your class diagram. (10pts)

   If you have the main structure of the Factory Method (the 6 classes on the right), you get the full credits. If you have one factory producing both Circle and Rectangle, then points would be deducted – Factory Method in this case should have separate Factories for each Concrete Product.



2. What is the role of the Canvas class in your design: is it part of the Factory Method Pattern, or

is it something external to the pattern? Justify your reasoning. (5pts).

Canvas makes more sense as an external class that's going to ask a Factory to build the product; but if you put Canvas inside the Pattern, that could still work as long as the Factory structure matches up the solution above.

3. Write some necessary sketch code for the classes you defined in Q1, that is enough to demonstrate the process of "drawing a circle on a canvas". You may describe the details of methods in the comments. (10pts)

   You should define the facotryMethod of creating a Circle in the CircleFactory class, and an Operation that calls this factoryMethod, either in an external Client class, or in the Abstract Creator.

4. Describe a scenario where the Factory Method might become insufficient, and that Abstract Factory might be better, e.g. such as introducing new elements like the Styles of the Shapes. No need to write code or draw diagram. (5pts)

   One possible example is when the program needs to create families of shapes with same styles, etc.

5. Open question: in the course project, if you were to use either Factory or Abstract Factory, how would you apply these patterns? Note that there are other Creational patterns that we haven't covered, so this question is to encourage you to start thinking about potential design.

   Use your answer here for discussions within your teams, and see if you can see the pros and cons of your choice. (10pts).