Homework 3 – Design Patterns /24

**Instructions**

* Submit as one Word document via email
* Document Name shall be: Homework3-<LastName,FirstName>
  + Example *Homework3-Snerfle,Burf*
* Email Subject Line shall be: CSCI3350-<Your Section Number>:Homework3
  + Example *CSCI3350-001:Homework3*
* Due 21 November, email prior to noon

**Questions**

1. Give and briefly describe the three categories of design patterns. (6 points)
2. Distinguish between class scope and object scope. (4 points)
3. Suppose that you are designing a website to sell a product. You want to provide the site visitor 3 methods of ordering: a conventional shopping cart, a 1-button click quick order option and order by talking to a human being. The implement of each of these three methods will be based upon the same underlying functionality to place the order. What design pattern is suggested? (2 points)
4. You have been tasked with writing a computer controlled server for the new departmental web based coffee machine. The machine has an Ethernet port than can be used to send basic command to the machine, move cup into position, dispense one of 5 types of coffee, dispense one of 4 additives, secure the top to the cup, etc. It is imperative that only one coffee machine controller be running on the server to prevent hodgepodge coffee. What design pattern is suggested? (2 points)
5. You are porting an application to a different platform. One component of the application is called LegacyShapes. Unfortunately, LegacyShapes uses a low level graphics API that is not available on the new platform. A different low-level graphics capability is available with similar functionality, but a different API. What design pattern is suggested? (2 points)
6. You are designing a Time and Talent Survey website for a local church. Suppose the administrator would like to be notified whenever a new survey is completed. What design pattern is suggested? (2 points)
7. You are writing a component that returns the nth prime number. Because the method that you are using requires that you find all primes prior to the nth prime, you decide save all the primes as they are generated. What design pattern could be used to implement this procedure? (2 points)
8. You are developing a graphics editor, within which a shape can be basic or complex. An example of a simple shape is a line object; an example of complex shape is a rectangle object. The rectangle object consists of four line objects. Because all shapes have many common operations and can be represented in hierarchy, you wish to treat all shapes uniformly What design pattern is suggested? (2 points)
9. For the objects in question 8 above, you want to be able to sequentially access all basic objects in the composite object, without regard to the type of the object. What design pattern is suggested? (2 points)

Nota Bene

The Bridge, Adaptor and Façade patterns superficially appear to be similar. The distinction:

**Façade** - Used to provide a simplified high-level interface to a set of low-level methods.

**Adaptor** - Used to present a more convenient interface to an existing interface.

**Bridge** - Used to provide an abstraction to your design to allow, for example, easy migration to some as of yet unspecified future platform. **The bridge design pattern is an integral part of a new design, not a fix to an existing design as is adaptor.**