

Name: _____

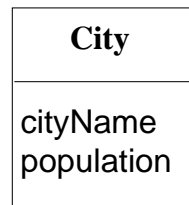
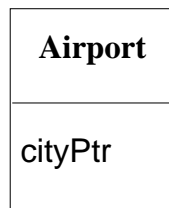
Exam 1

Score: /100

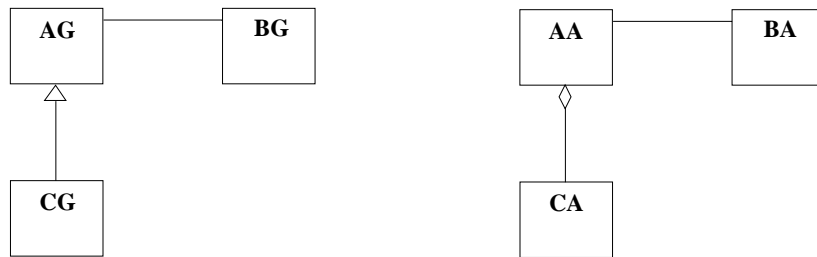
1. (10 pts.) Software Engineering

Contrast the object-oriented development paradigm versus structured analysis/structured design approach. (What is the emphasis in each?)

2. The attribute “cityPtr” is defined in class **Airport** to be a pointer to objects in class **City**. What is wrong with this? Draw a proper model.

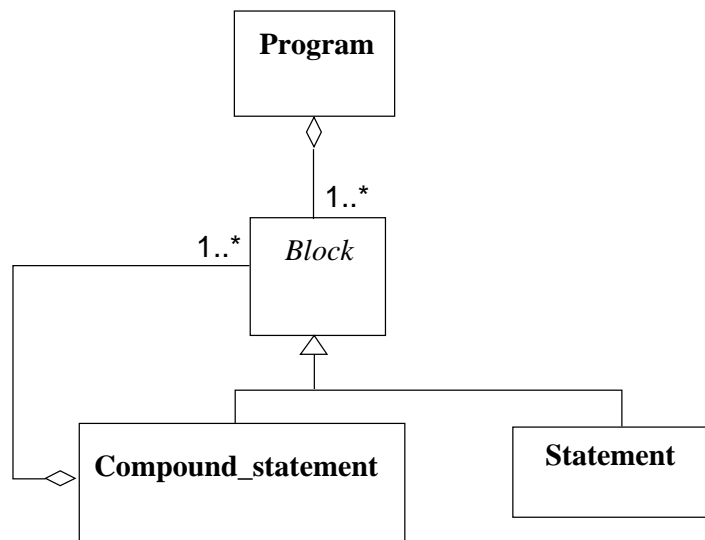


3. Two class diagrams are shown below. How does the relationship between classes **BG** and **CG** differ from the relationship between classes **BA** and **CA**?

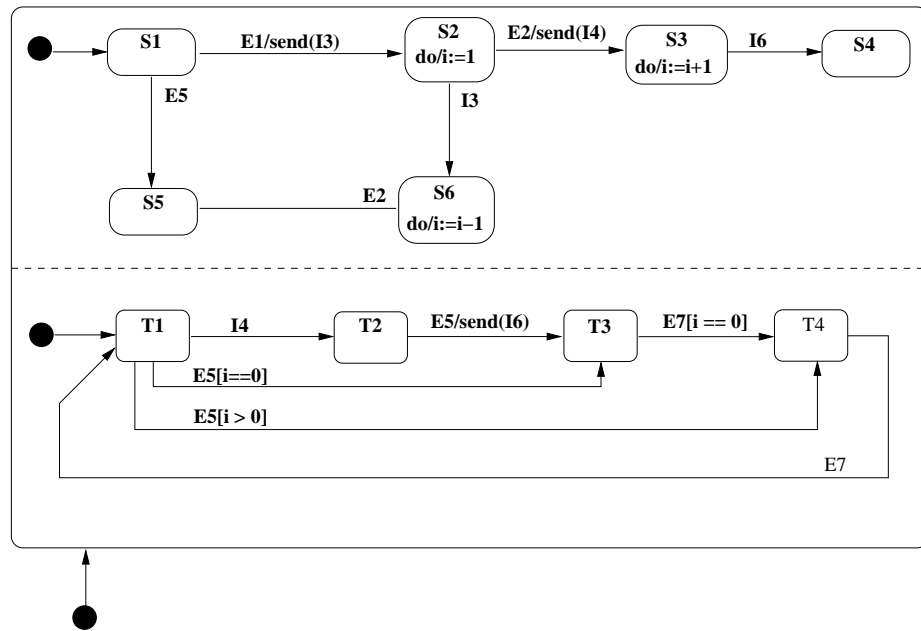


4. In class we discussed the commonly recurring class diagram pattern shown below. This diagram describes a simple program structure. Draw the instance (object) diagram for the following small program that was derived from the class diagram. Notice that class *Block* is abstract.

```
i := 0;
while( i > 0) {
    sum := sum + 1;
    i = i + 1;
}
k = i;
```



5. Given the event sequence E1, E2, E5, E7, plus any events generated by the state machine itself, write down the state sequences (separately) for each dynamic model component in the model below. Use conventional semantics for inter- and intra-object events as we discussed in class. Assume the “E*” events come from another object.



6. (20 pts.) UML

What are the 4 types of UML diagrams we use for modeling embedded systems? (Be sure to define the major constructs for each diagram AND explain the objective for each diagram.)

7. (10 pts.) Embedded Systems.

What are the three major types of components in an embedded system? (Define each)
How do they relate to one another?

8. (15 pts.) Embedded Systems.

What are three properties of embedded systems that make them more complex to develop when compared to “traditional software systems”? Explain.

9. (15 pts.) Explain how the following three approaches are used for Quality Assurance in software development (Include, for each, their objective.)

(a) (5 pts.) Testing

(b) (5 pts.) Inspection/Reviews

(c) (5 pts.) Formal Methods

10. (25 pts.) (System Design)

(a) (10 pts.) Explain the difference between layers and partitions. (Feel free to use a diagram to assist in your response.)

(b) (10 pts.) Explain the difference between a *closed* and an *open* architecture. Is this distinction applied to layers or partitions?

(c) (5 pts.) What is the difference between *cohesion* and *coupling*? (which one is minimized and which one is maximized) Is this distinction applied to layers or partitions?