

CSC340 MIDTERM (100 total marks)
SHOW ALL OF YOUR WORK! One 8.5" x 11" fact sheet allowed.

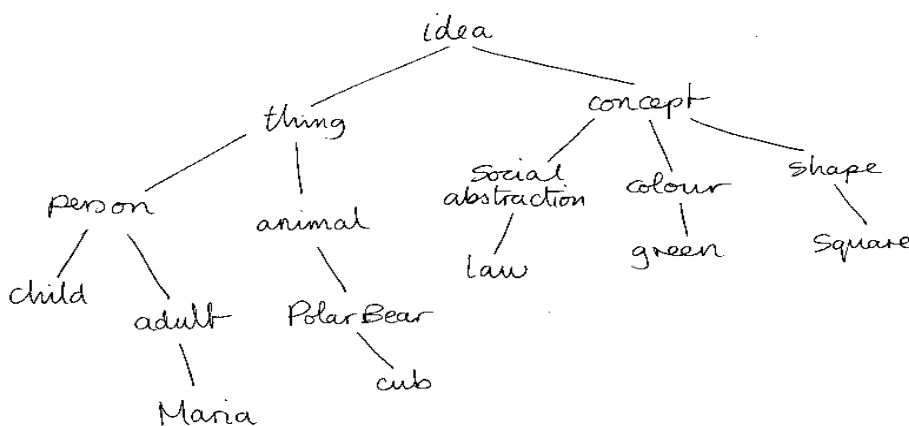
LAST NAME: _____ FIRST NAME: _____

STUDENT NUMBER: _____

1. [50 marks (10 marks for each part)] Answer the following questions:

- a. What are the relationships between business goals, information systems strategy, and information technology strategy?
Business goals and strategy are usually defined first. An IS strategy identifies applications that can help to meet business goals, and an IT strategy identifies IT needed to develop and run the applications. Each informs its predecessor about what can realistically be achieved. The process is iterative.
- b. How does prototyping differ from incremental development?
Prototyping is not necessarily concerned with delivering a working system whereas an incremental approach delivers a working system in successive increments. Note that in the Unified Software Development Process an increment may be any life cycle product.
- c. What rules describe the relationship between a subclass and its superclass?
A subclass inherits all characteristics of its ancestors including its immediate superclass (some may be overridden, but are still technically inherited). Each subclass is different from its ancestors in at least one way.
- d. What is the difference between a diagram and a model?
A diagram is a graphical representation of something; a model is an abstraction of some system or sub-system from a particular perspective, using diagrams and textual information.
- e. In what two ways can a decision be represented in a UML activity diagram?
By a transition to a diamond shape and then the alternative paths branching out from the diamond, or by having the alternative transitions leaving a state. Guard conditions in square brackets are used to show the conditions that must be satisfied for one of the alternatives to be taken.

2. [20 marks] Arrange the following into a hierarchy that depends on their relative generalization or specialization: person, thing, green, shape, Maria, cub, polar bear, square, law, child, color, animal, idea, concept, social abstraction, adult.



3. [30 marks (15 marks for each part)] Consider a database system that processes three kinds of requests. Requests are generated by users. Each request is processed by a different request handler, and each handler has three sub-handlers. A request interface initially receives the requests and decides which handler is needed. Each request has a parameter that determines whether one, two, or all three sub-handlers will be invoked. (If more than one sub-handler is invoked, they are invoked in sequence – ie: no parallelism.) Once a request is processed by its handler, the result is presented to the user, and the user observes the result.

a. Draw the activity diagram for this system.

There will obviously be variations to the solution. Make sure that the student's diagram captures the possibilities introduced by the various ways that a request can be handled.

b. How can the activity diagram from part 3a be modified so that it captures the stochastic properties of the system? Address what data is needed to make these modifications.

The diagram should be modified by adding probabilities at every possible decision point. Alternatively, the diagram can be modified by describing the distribution that characterizes the process at each of the decision points.

The data needed to produce probabilities/distributions is the observed characteristics of the requests. This will allow for determining how frequently the handlers and the sub-handlers are invoked, and this will help capture the behaviour of the system.