

**University of Toronto at Mississauga****Midterm Test**

**Department:** Computer Science  
**Instructor:** Faye Baron  
**Date and Time:** 4:10pm, Wednesday March 9, 2005

**Conditions:** Closed Book  
**Duration:** 50 minutes

**This test counts for 20% of your final grade**

Name: \_\_\_\_\_  
(Please underline last name)

Student Number: \_\_\_\_\_

**Question Marks**

1 \_\_\_\_\_ /20

2 \_\_\_\_\_ /30

3 \_\_\_\_\_ /20

Total \_\_\_\_\_ /70

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1. [Short Questions; 20 marks total]

**(a) [Eliciting Requirements – 5 marks]** One of the challenges of requirements elicitation is dealing with bias. Name and describe two types of bias. Give an example of each.

Motivational bias occurs when someone makes accommodations to please the interviewer or a third party. For example, in an interview an employee may alter his response to a question in order to please his or her supervisor.

Notational bias occurs when the terms used to describe a problem affect our understanding of it. For example, when using goal modeling we may be biased to think in terms of goals (this is true of any modeling technique you use).

[Note: other types of bias include observational and cognitive.]

**(b) [Feasibility Analysis – 5 marks]** In cost/benefit analysis, the return-on-investment and the payback period are often computed. Describe each of these calculations and discuss the information that they provide. How are they used to determine the feasibility of the project?

Return-on-investment (ROI) is a measure of the lifetime profitability of an investment. It is the ratio of the benefits of the investment to the amount invested.

The payback period is the amount of time that it takes for an investment to break-even. In other words, it is the amount of time that it takes for the lifetime benefits to overtake the lifetime costs.

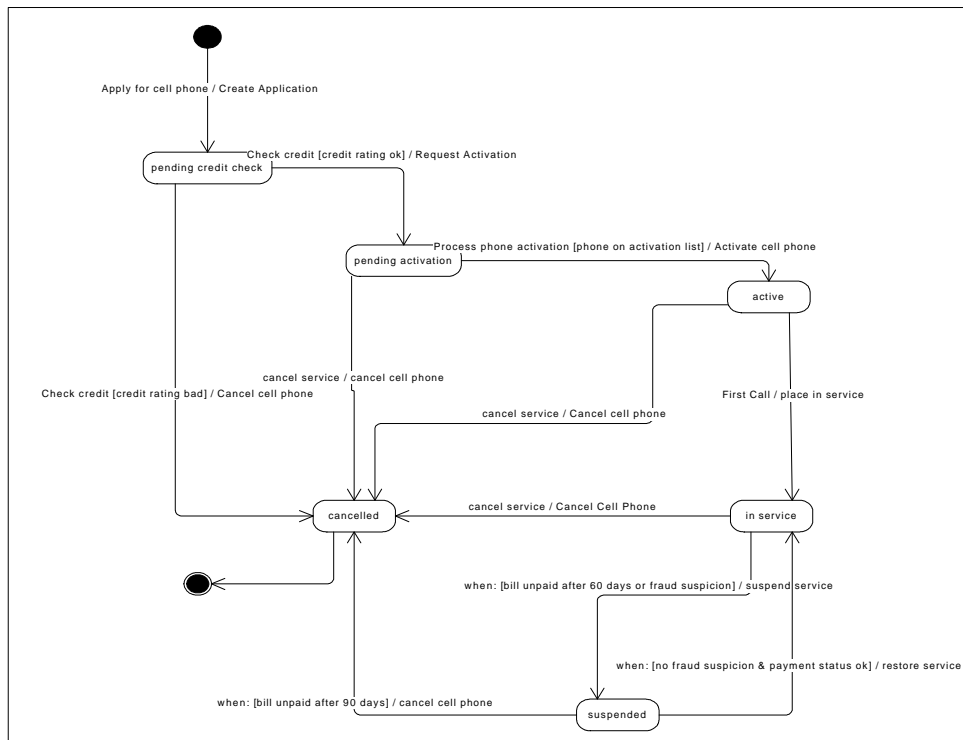
ROI and the payback period can be used together to determine whether a project is economically feasible. ROI tells you how much money an investment will make, and the payback period indicates when the benefits of that investment will be reaped.



## 2. [State Diagram, Class Diagram, and SCR Table – 30 marks]

A customer goes to a cell phone store to purchase a cell phone. The salesman creates a cell phone application for the customer, including the cell phone identifier and the customer application information. The cell phone status is set to *pending credit check* and the phone remains inactive until the salesman has established the credit rating of the potential customer. If their credit rating is satisfactory, the salesman submits an activation request to the switching department, and the status of the cell phone is set to *pending activation*. If the credit rating is unsatisfactory, the cell phone purchase is cancelled and the status is adjusted accordingly. The switching department then activates the cell phone that is *pending activation* by adding it to the list of valid cell phones on the cell phone system, assigning it a status of *active*. Now, the cell phone is *active*. When the customer makes their first phone call following activation, the cell phone status is set to *in service* and the start date of service is established. If the customer tries to use the cell phone, and the cell phone is not *active* or *in service*, the call is refused. Once a month, the charges for the cell phone are accrued and sent to the customer. If the bill is not paid within 60 days, the cell phone is *suspended* and the switching department tags it as such in order to prevent usage. Subsequently, if the balance is paid within 30 days, the phone is reactivated, and the status is set to *in service*, otherwise the customer account is cancelled and the cell phone status is set to *cancelled*. If the fraud department suspects misuse of the cell phone, they will *suspend* the use of the cell phone. The phone remains suspended until all suspicion is eliminated, at which time it is placed back *in service*. The customer can cancel their cell phone account at any time.

(a) Draw a **State Diagram** for the states that a cell phone status can be in, using the description provided. [15 marks]





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**3. [ACTIVITY Diagrams – 30 marks]**

A customer goes into the Blodgers Communications store to purchase a cell phone and establish service. The sales representative enters the application details and the cell phone identification number into the system. He/she also performs a credit check with the credit bureau. If their credit rating is good, a phone number is assigned to the cell phone. The number is then given to the customer and a request for activation (of that number) entered in the system. Every hour, activation requests are sent from the system to the switch. The switch activates the phone. The customer then uses their cell phone for the first time. The call is routed through the switch which then signals the system that the phone is actively in-service.

If the customer's credit rating is not satisfactory, the customer is refused service, and the application is cancelled in the system.

Create activity diagrams (including swimlanes) illustrating the above cell phone provisioning process.









[scratch paper]