SWEN102

Introduction to Software Modelling

Midterm Test

21 August 2009

Answer All Questions

Please Write Neatly

Time Allowed: 50 Minutes

Marks Overall: 50

Numeric Calculators Allowed.
Non-Electronic Translation Dictionaries Allowed.

	Topic	Marks	
1.	Use Cases	25 marks	
2.	Domain Analysis	25 marks	

1. Use Cases [**25 Marks**]

   (a) [**3 Marks**] Perform a *textual analysis* on the following description, to find candidate use cases. Carefully and neatly underline key verb phrases in the text in the box.

ATB provides online banking via a secure website. The system implements a range of services. Customers can, for example, <u>check the current balance</u> on any of their accounts or <u>transfer money between accounts</u>.

When <u>opening an account</u>, customers provide a password. This is entered twice to prevent mistakes. The password is needed to access the system.

When <u>transferring money between their own accounts</u> users click on the accounts in question, and enter the amount. One cannot transfer a negative amount of money.

To <u>pay bills</u> (e.g. electricity bill), customers first <u>set up a Payment Payee</u> (e.g. Meridian Energy) by providing the company details and their account number. Once setup, they can <u>make payments to that payee</u> in the same way as transferring money.

Bank staff <u>monitor money transfers</u>. When large sums are transferred, they are <u>automatically notified</u>. Staff may investigate this by <u>looking up information on the customer</u>, such as their transfer history. Typically, they are checking whether there are previous transfers of a similar amount. If the staff member becomes suspicious, they may <u>call the account holder</u> and check with them personally.

(b) [**3 marks**] Give names for the three candidate use cases you consider most important.

i.   Check Balance

ii.   Open Account

iii.   Transfer Money

(c) [**4 marks**] Draw **essential use case cards** for two important and interesting use cases in this system.

Open Account	
Enter Details	Request Details
	Store Details
	Request Password
Enter Password	Store Password
	Create Account

Transfer Money	
Identify Self	Verify Identity
	Display Accounts
Select Account From	
Select Account to	
	Request Amount
Enter Amount	Check Amount
	Transfer Money

(d) **[6 marks]** Draw a *use case diagram* for the ATB system.
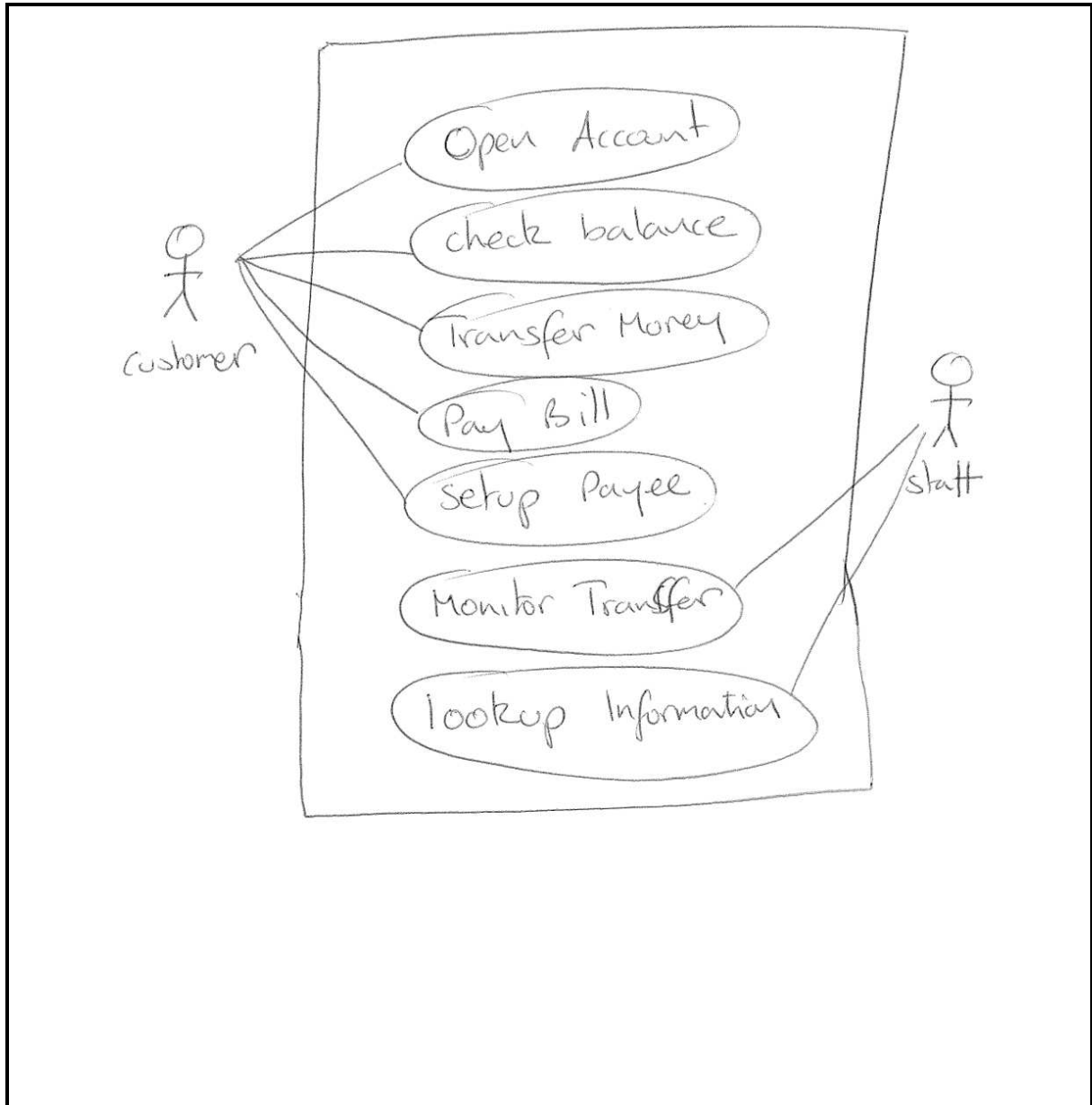
(e) **[3 marks]** The customer is an actor in this system. List the main characteristics of this actor.

i. **Domain Knowledge.** The customer has medium domain knowledge, since they are likely to know a reasonable amount about how banks operate.
ii. **Systems Knowledge.** The customer has low systems knowledge, since they are unlikely to know much about the specific systems used in the bank.
iii. **Frequency of Use.** The customer has relatively high frequency of use, since they are likely to uses their accounts on a regular — even daily — basis.

(f) [**6 marks**] For each of the following statements, write one or two sentences justifying why it is important.

    i. *"The system must be secure"*
       The system must be secure to prevent, for example, someone transferring money out of someone else's account!

    ii. *"The system must be correct"*
       The system must be correct to ensure that all transactions are implemented as requested. For example, it must not be possible that a customer requests a transfer amount of $100, and actually $1000 is transferred.

   iii. *"The system must be available"*
       One of the main advantages of an online system is that it is available anywhere there is an internet connection. For example, customers may want to check their account balances in different time zones, or simply after work at home.

2. Domain Analysis [**25 Marks**]

(a) [**12 marks**] Consider the object diagram on this left-hand page. Draw a *well-designed* class diagram that is consistent with this object diagram.
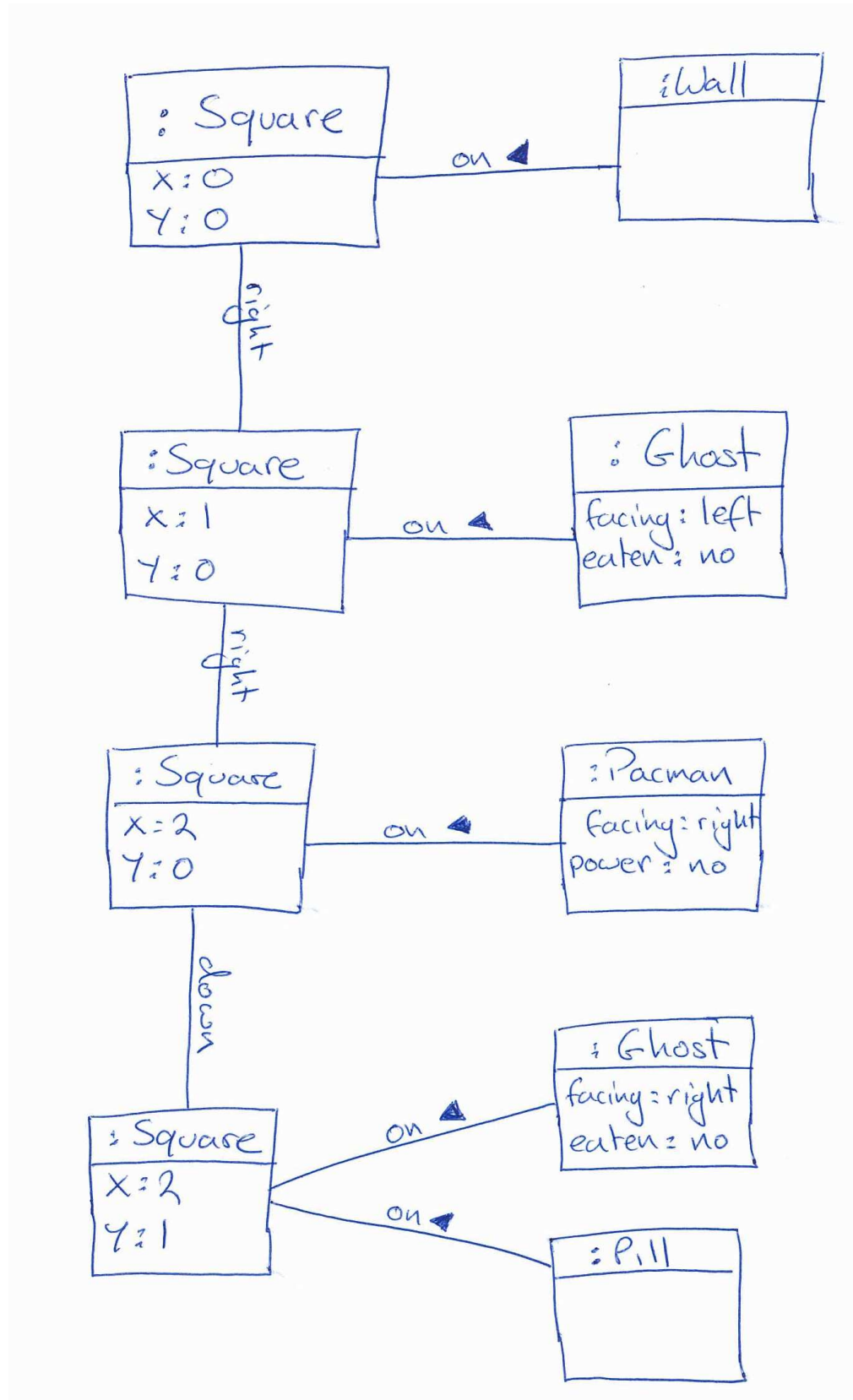
(words used: Square, on, Wall, x, y, right, Ghost, facing, left, eaten, no, Pacman, power, down, Pill)
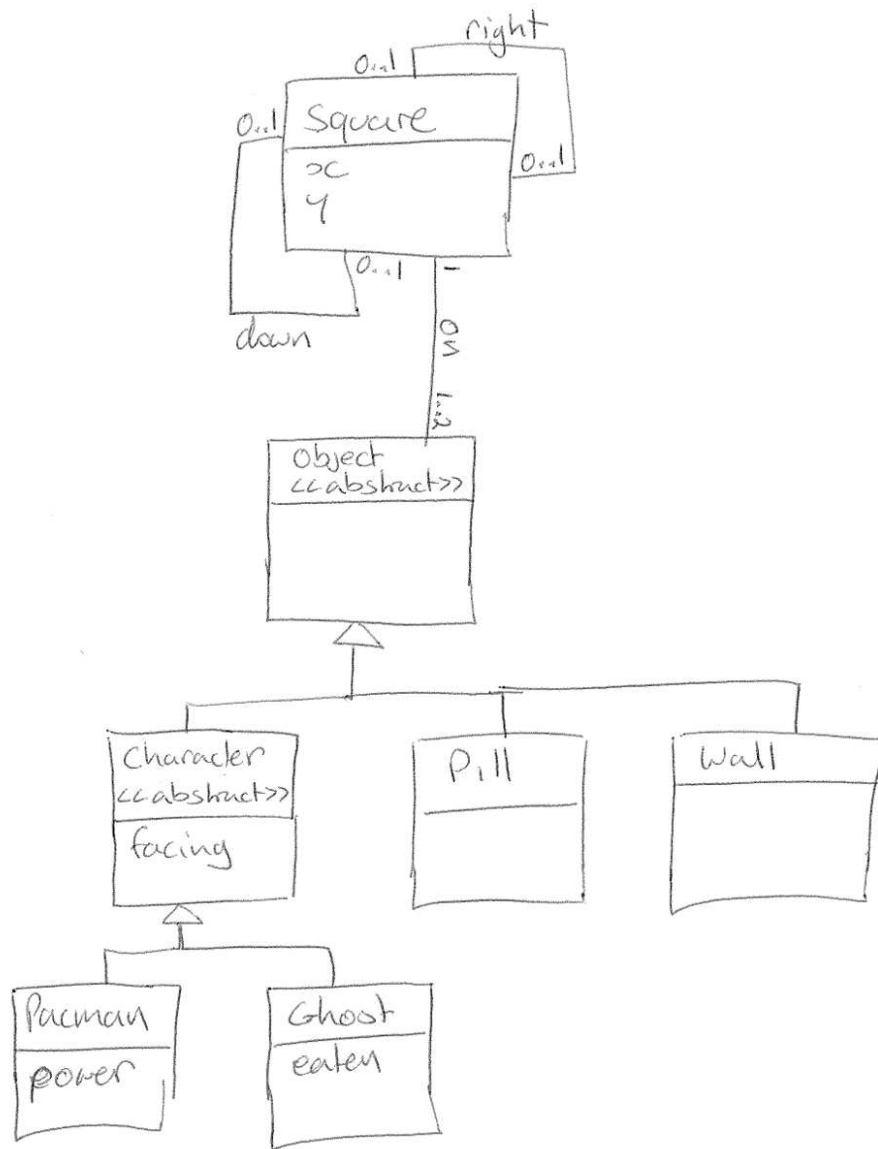
(b) [**3 marks**] Perform a *textual analysis* on the following description of a *mapping system* to find candidate classes. You should carefully and neatly underline key noun phrases in the text in the box.

A <u>geographical region</u> is an <u>area of a map</u> which is either: a <u>water area</u> (for seas and oceans); an <u>urban area</u> (for towns and cities); or, a <u>general land area</u>. Regions may contain other regions (e.g. the North Island is a region of New Zealand containing Wellington).
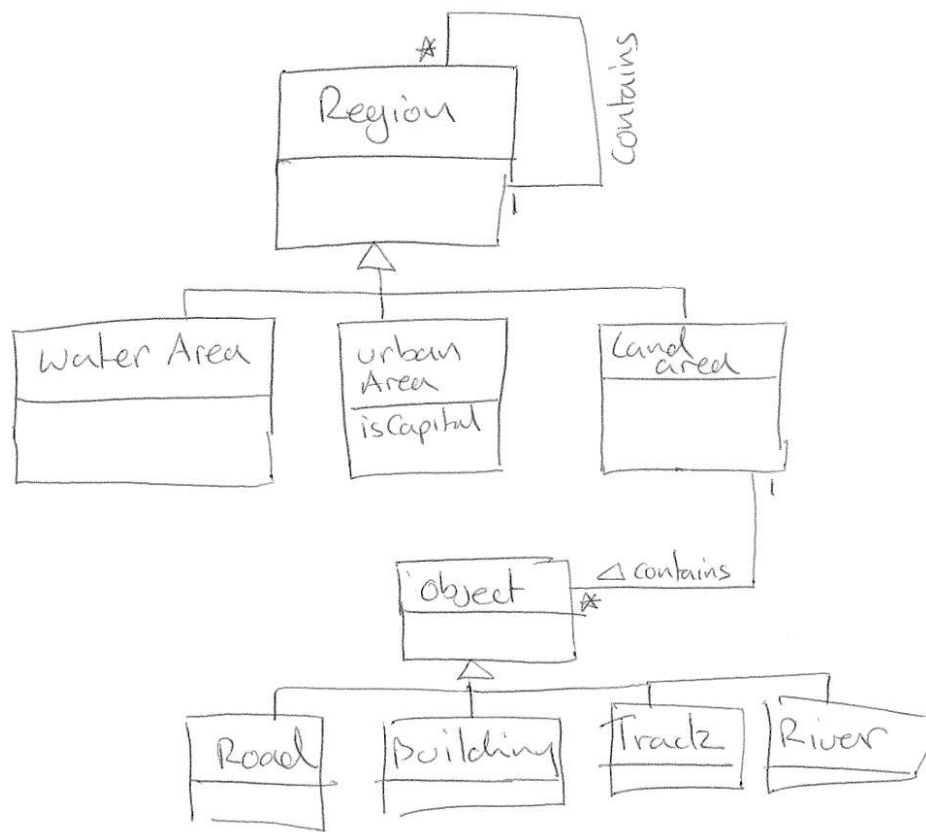
Each region has a name and records its population. Urban areas can be identified as the <u>capital of their country</u>. Land areas may contain certain <u>objects</u>, such as <u>roads, railway tracks, buildings and rivers</u> etc

(c) [**3 marks**] Give names for the three candidate classes you consider most important.

    i.   Region

    ii.   Land Area

    iii.   Urban Area

(d) [**7 marks**] Draw a **Class Diagram** for the mapping system.

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