NAME: ID:

I declare that this is all my own work.

SIGNATURE:

SWEN102

Introduction to Software Modelling

Midterm Test

10th September 2012

Answer All Questions

Please Write Neatly

Time Allowed: 50 Minutes

Marks Overall: 50

Calculators are NOT PERMITTED.
Non-Electronic Translation Dictionaries Allowed.

	Topic	Marks	
1.	Use Cases	20 marks	
2.	Domain Analysis	20 marks	
3.	Invariants	10 marks	

1. Use Cases **[20 Marks]**

   (a) **[3 Marks]** Perform a *textual analysis* on the following description, by carefully and neatly underlining key verb phrases that could lead to candidate use cases

"YourJunk.co.nz" is a new website designed to help people sell stuff that they don't want. Users (called "junkers") have to set up an account, giving a username and a password. When they are logged in, junkers can choose junk they'd like to buy, searching by keywords, or browsing by categories. The most popular junk is displayed on the site homepage.

Before they can sell Junk, junkers must have an account, and have deposited at least $10 into their account with a credit card. Then junkers can upload pictures and a textual description of their junk, and a price. Junkers can also post a comment onto any piece of junk. Junkers wanting to buy junk use these comments for asking questions, or asking for a lower selling price, while sellers can reply to questions.

When a junker tries to buy someone else's junk, they must already have enough money deposited in their account to pay for the junk (otherwise it's an error, and they need to top up their account). If they can afford the junk, its price is deducted from the buyer's account, and 90% of the price is added to the seller's account (YourJunk.co.nz takes the last 10%). There's no way to get money out of YourJunk.co.nz — the only thing you can do is buy more junk!

(b) **[8 marks]** Draw a *use case diagram* for the website system, showing at least 4 use cases. Make clear how the system handles the **Buy Junk** use case when a junker doesn't have enough money in their account.

(c) **[3 marks]** Provide a *use case description* for the "happy path" of the **Buy Junk** use case.

(d) **[2 marks]** Write a short *persona* for the **Junker** actor.

(e) **[4 marks]** Briefly justify why these two *systemic requirements* are important to the YourJunk.co.nz system.

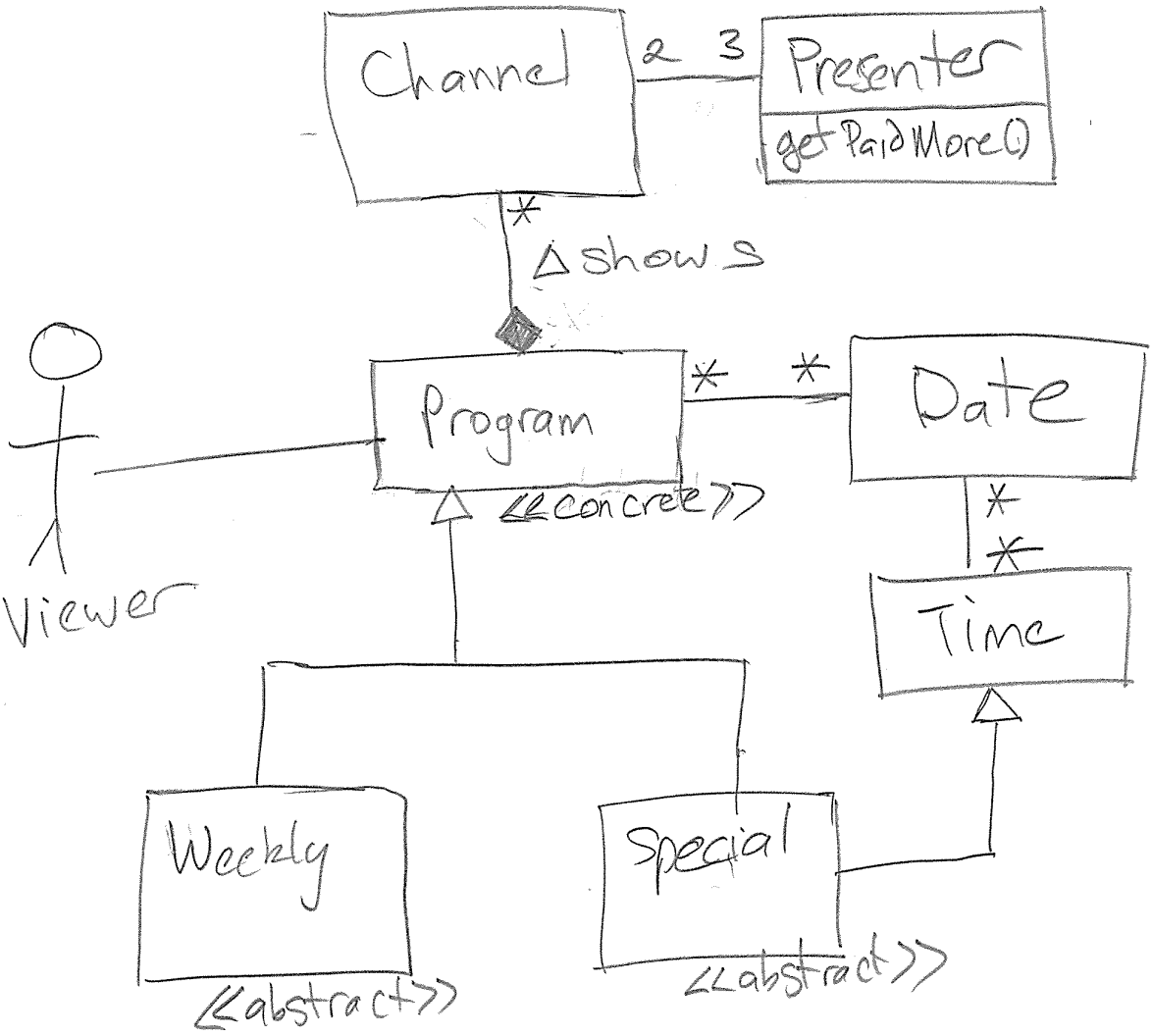
i. *Security:*

ii. *Usability:*

2. Domain Analysis **[20 Marks]**

(a) **[5 marks]**

The following class diagram for a TV guide website has been produced by an expensive, well-dressed contractor. Unfortunately she abandoned the project before completing the analysis because she was offered a much better paying job.



Circle **five distinct** problems in this diagram. For each problem, number it and briefly describe why it is a problem.

i.

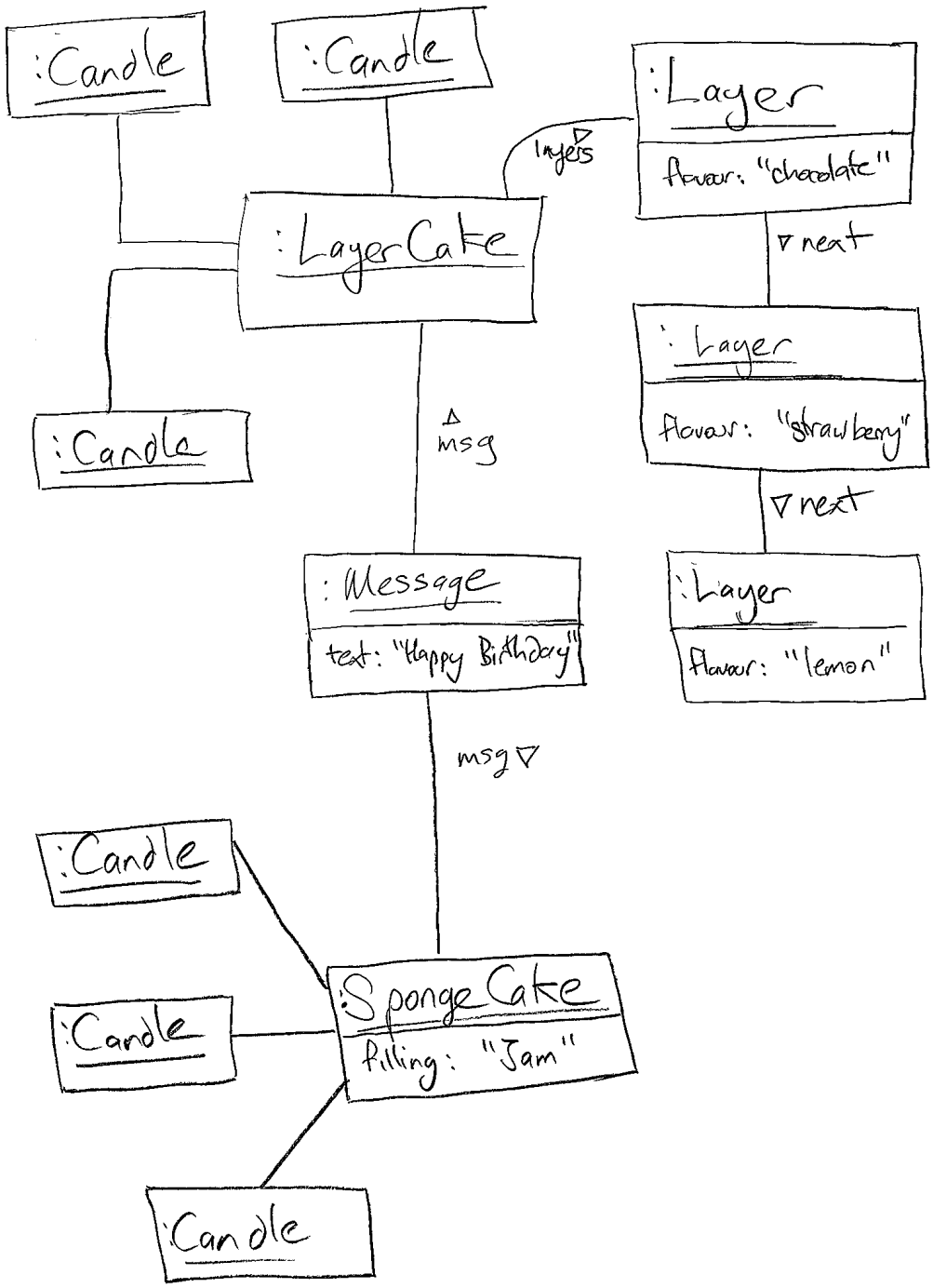
ii.

iii.

iv.

v.

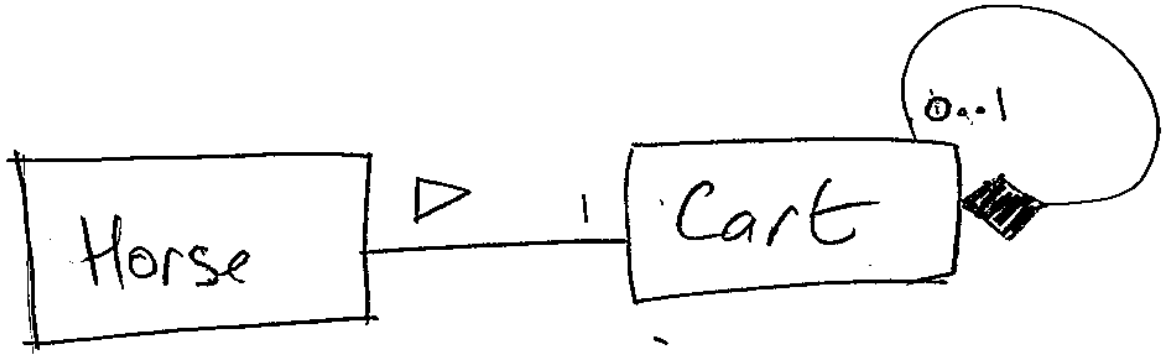
(b) **[10 marks]** Consider the **object diagram** on this left-hand page. On the right-hand page, draw a well-designed **class diagram** that is consistent with this object diagram.



(words used: Candle Layer LayerCake Message SpongeCake msg next filling flavour)

(c) **[5 marks]**

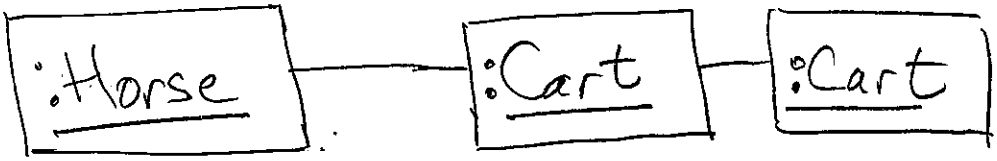
Consider the class diagram below:



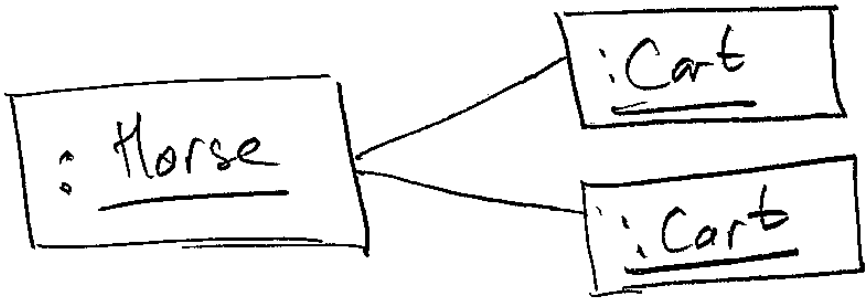
For each object diagram below, state whether it is **consistent** or **inconsistent** with the class diagram above. If the object diagram is inconsistent, briefly explain why.

i.

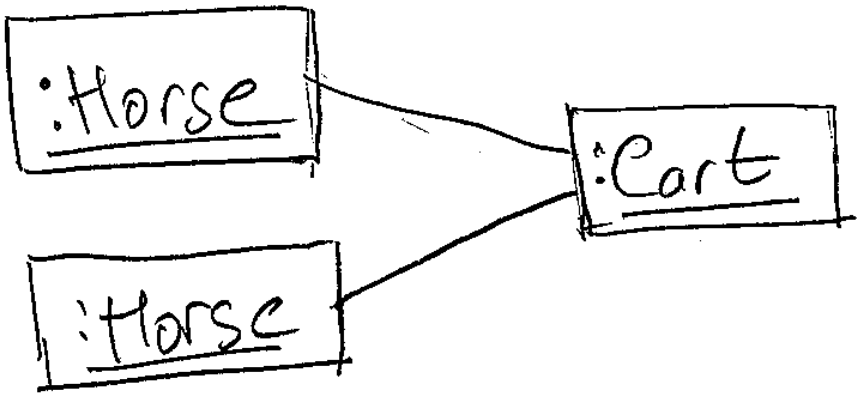
ii.



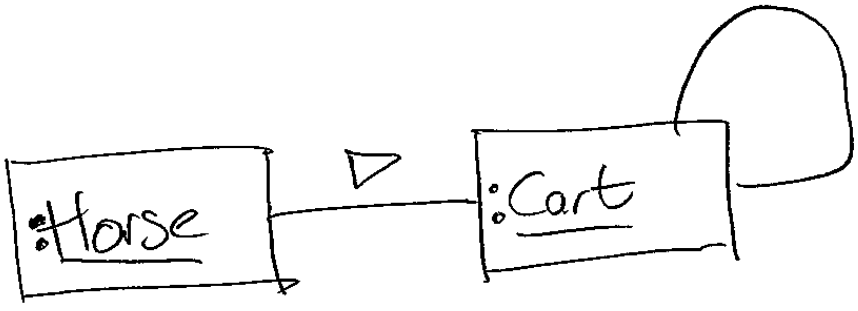
iii.



iv.

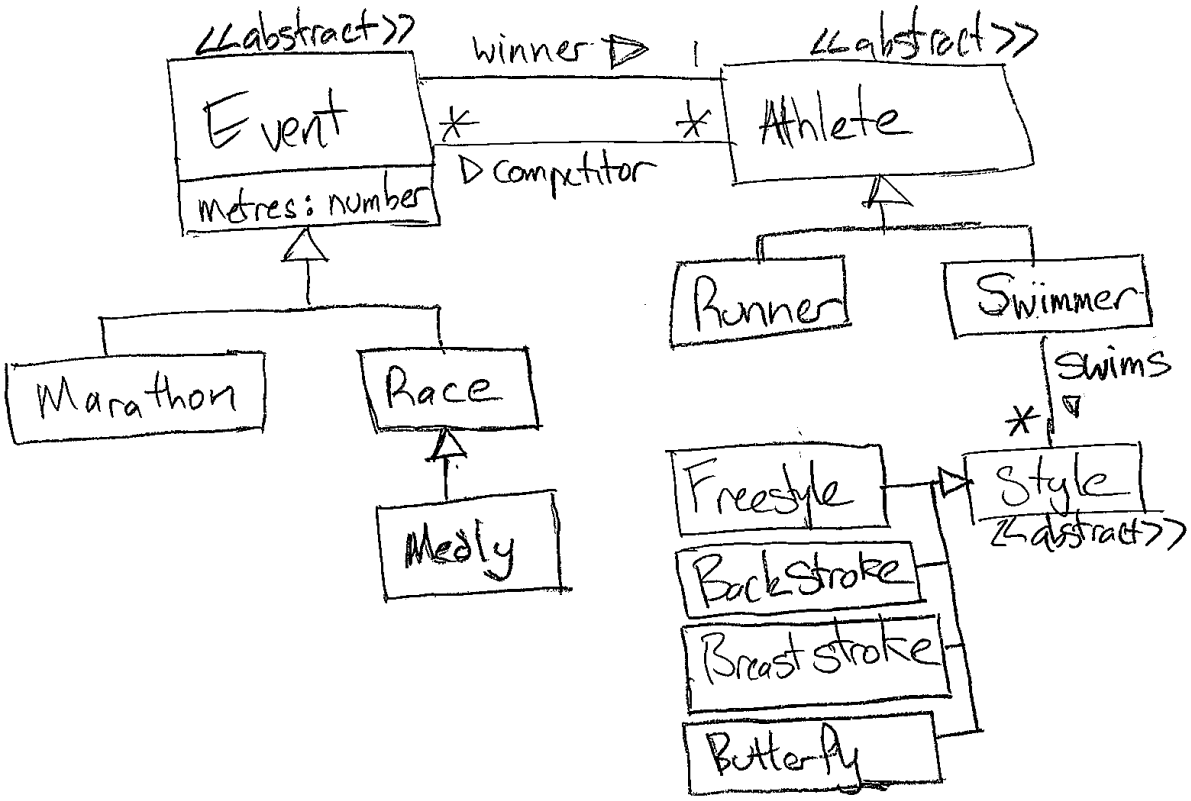


v.



3. Invariants **[10 Marks]**

Consider the class diagram below:



Translate these invariants into English:

(a) (in class Event) `this.winner in this.competitor`

(b) (in class Marathon) `one r : Race | #(r.competitor) == 7`

Translate these invariants into formal notation:

(c) A Marathon is 42 kilometres long.

(d) Only Runners can compete in a Marathon.

(e) Only Swimmers with all four swimming Styles can complete in a Medley

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