

NAME:

ID:

I declare that this is all my own work.

SIGNATURE:

# **SWEN102**

Introduction to Software Modelling

Midterm Test

7th September 2010

**Answer All Questions**

**Please Write Neatly**

**Time Allowed: 50 Minutes**

**Marks Overall: 50**

**Calculators are NOT PERMITTED.**

**Non-Electronic Translation Dictionaries Allowed.**

|           | <b>Topic</b>    | <b>Marks</b> |                      |
|-----------|-----------------|--------------|----------------------|
| <b>1.</b> | Use Cases       | 25 marks     | <input type="text"/> |
| <b>2.</b> | Domain Analysis | 25 marks     | <input type="text"/> |

1. Use Cases [25 Marks]

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

Users of the website `dugg.com` can browse news stories submitted by other users. Users can vote for a news story they like by clicking a button next to it. Stories are ranked by the number of votes they have, so that those with more votes are displayed first.

To submit a news story, a user must have an account. To create an account, a user chooses an appropriate username and password. This fails if the requested username is already in use, or the password supplied is too short.

Only registered users may vote on stories. The system attempts to detect “aliases” — that is, users which have multiple accounts.

This is done by recording the IP address of the computer the user votes from. Each user (including all aliases) can only vote for a news story once.

Users may also comment on news stories. Each comment is limited to 500 characters. When submitting a comment, unregistered users must enter a special word-phrase, viewed as an image. This is to prevent spamming.

Finally, user accounts may be banned by the website administrators if they are caught spamming — that is, submitting advertisements disguised as news stories or comments.

- (b) [4 marks] Consider the “Vote For Story” use case. Provide *use case descriptions* for the main success sequence, and one alternative or error sequence.

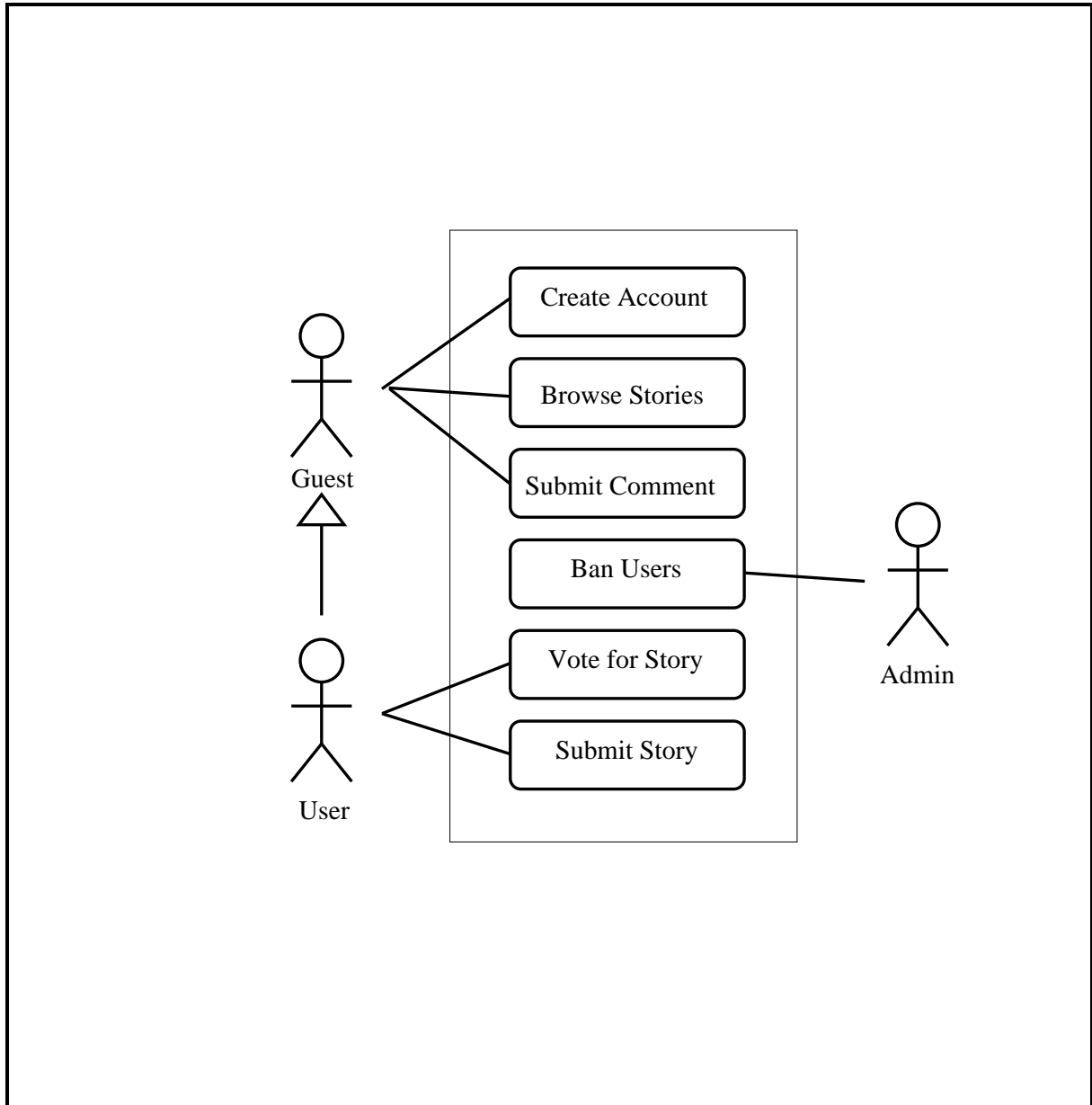
|                                  |   |
|----------------------------------|---|
| Vote For Story:<br>Precondition: | User<br>Logged On   |
| Select Story<br>Vote for Story   | Check if Already Voted<br>Update Vote Count<br>Update Ranking |

|                                  |   |
|----------------------------------|---|
| Vote For Story:<br>Precondition: | (Alternate Sequence)<br>Logged On                         |
| Select Story<br>Vote for Story   | Check if Already Voted<br>Display “Already Voted Message” |

- (c) [3 marks] Choose another important use case from the system, and provide a use case description of the main sequence.

|   |  |
|---|--|
| Create Account:<br>Precondition:                              | Guest<br>not Logged On   |
| Choose Create Account<br>Enter Username<br><br>Enter Password | Request Username<br>Check username not already used<br>Request Password<br>Check password not too short<br>Create Account<br>Record IP Address |

(d) [6 marks] Draw a *use case diagram* for the website system.



(e) [3 marks] List the main characteristics of an important *actor* in the system.

User

- Will understand voting systems, and be familiar with websites — hence, expect medium domain knowledge.
- Will not necessarily be familiar with how websites are constructed or run; hence, expect low system knowledge.
- As is a registered user, will expect high-frequency of interaction, probably on a daily basis.

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

- i. *“The system must be secure”*

As the system holds personal information of users, it must ensure that these are securely maintained. In particular, that users cannot impersonate users on the site (e.g. submitting stories under another account), or access the private information. The system should also be secure against spammers who would reduce the quality of the website through needless and unrelated adverts.

- ii. *“The system must be correct”*

The system should record and display stories accurately, in to reflect what users submit. Similarly, the system should count votes correctly, in order that good articles are promoted. Otherwise, the value of the website will be significantly reduced, and users may go elsewhere.

- iii. *“The system must be available”*

As the system is accessed through a website, users expect that it will be available all of the time. In particular, users may be in different time zones and will be unhappy if they cannot access the website when they want to. Furthermore, frequent outages of the website will result in users going elsewhere for their news.

## 2. Domain Analysis [25 Marks]

- (a) [3 Marks] Perform a *textual analysis* on the following description to find candidate classes, by carefully and neatly underlining key noun phrases in the text.

Behind the scenes, the **dugg.com** website is implemented using a software layer, backed by a database. Each user account is recorded, along with the given username and password. The IP address of machines commonly used by an account are also stored. A “user” is associated with one or more user accounts. Thus, the system can tell whether two accounts are “aliases” by checking whether they have the same “user”. Banned users are marked by a flag on their record.

For every story submitted, the system records the submission time and date, and the account which submitted it. Likewise, every account which has voted for a story is known in order to ensure one vote per “user”. Every comment is recorded, along with the account creating it.

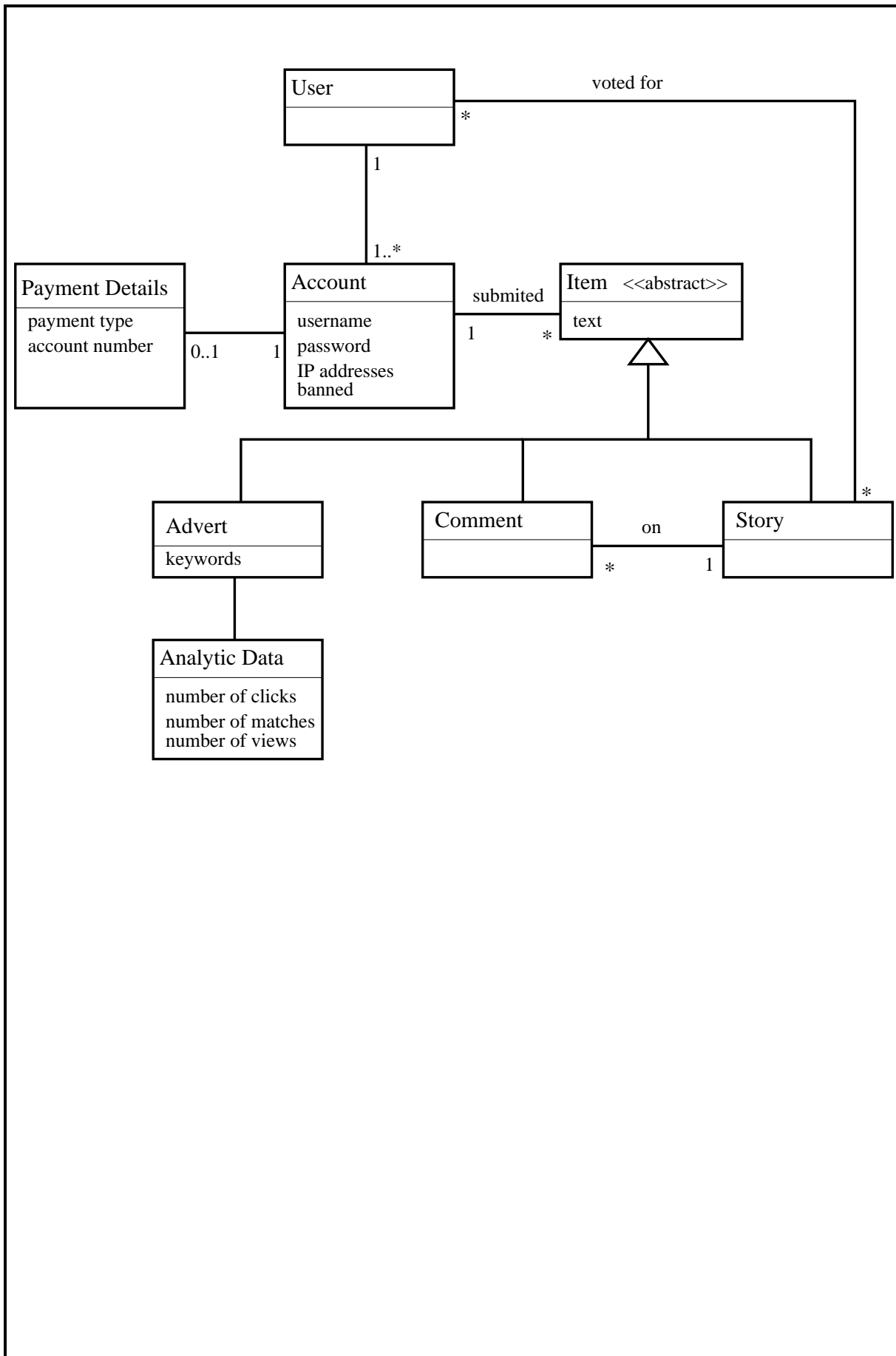
In addition to submitting stories, users may also pay for advertising space. To do this, a user must first verify their payment details. Then, he/she can submit the advert text, along with a number of keywords. The keywords are used to target adverts; that is, adverts are only displayed for stories matching the given keywords.

Every advert generates analytic data. This includes: the number of times it was displayed; the number of times a user clicked on it; and, the number of stories which matched its keywords. This information is used to help advertisers in reaching their target audience.

- (b) [4 marks] Briefly discuss one important way in which the system description is *inconsistent*, *ambiguous* or *incomplete*.

The system is *incomplete* with regard to the description of banned users. For example, when a user is banned, does this mean all of his/her accounts are banned as well? or, is it that only one account is banned at a given time. The description also does not say what effect being banned has. Presumably, users will still be able to browse stories, but not vote on them. Finally, if all accounts at a given IP address are banned, this will cause trouble for users (e.g. families) which share the same machine.

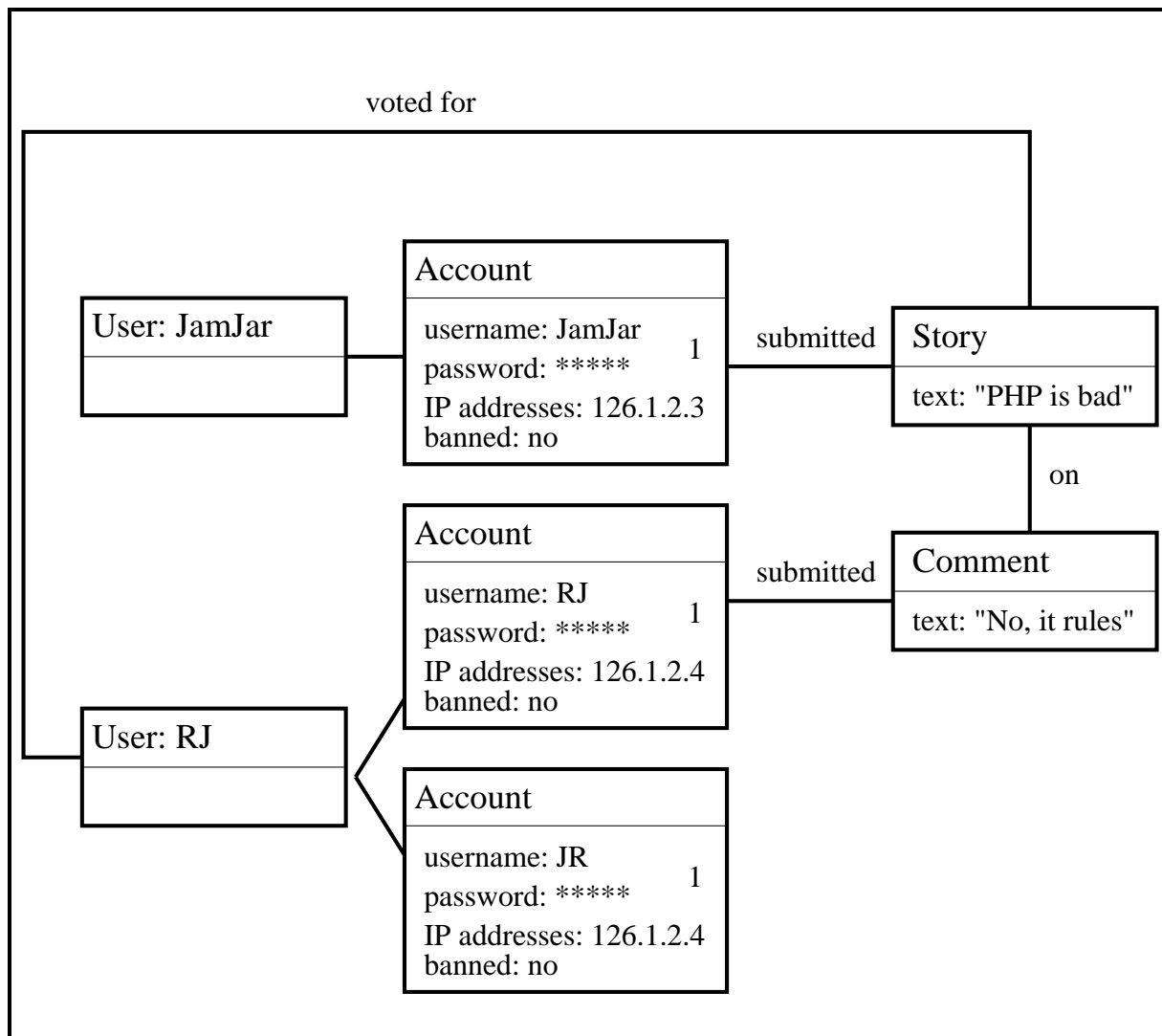
(c) [12 marks] Draw a *well-designed* class diagram for the website system.





- (d) [6 marks] In the box below, draw an *object diagram* consistent with your class diagram which captures the following scenario:

“A story on PHP development was submitted from user account **JamJar**. An alias of user account RJ voted on it, and user account RJ left a comment on the story”



THIS PAGE LEFT BLANK

THIS PAGE LEFT BLANK

THIS PAGE LEFT BLANK