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.

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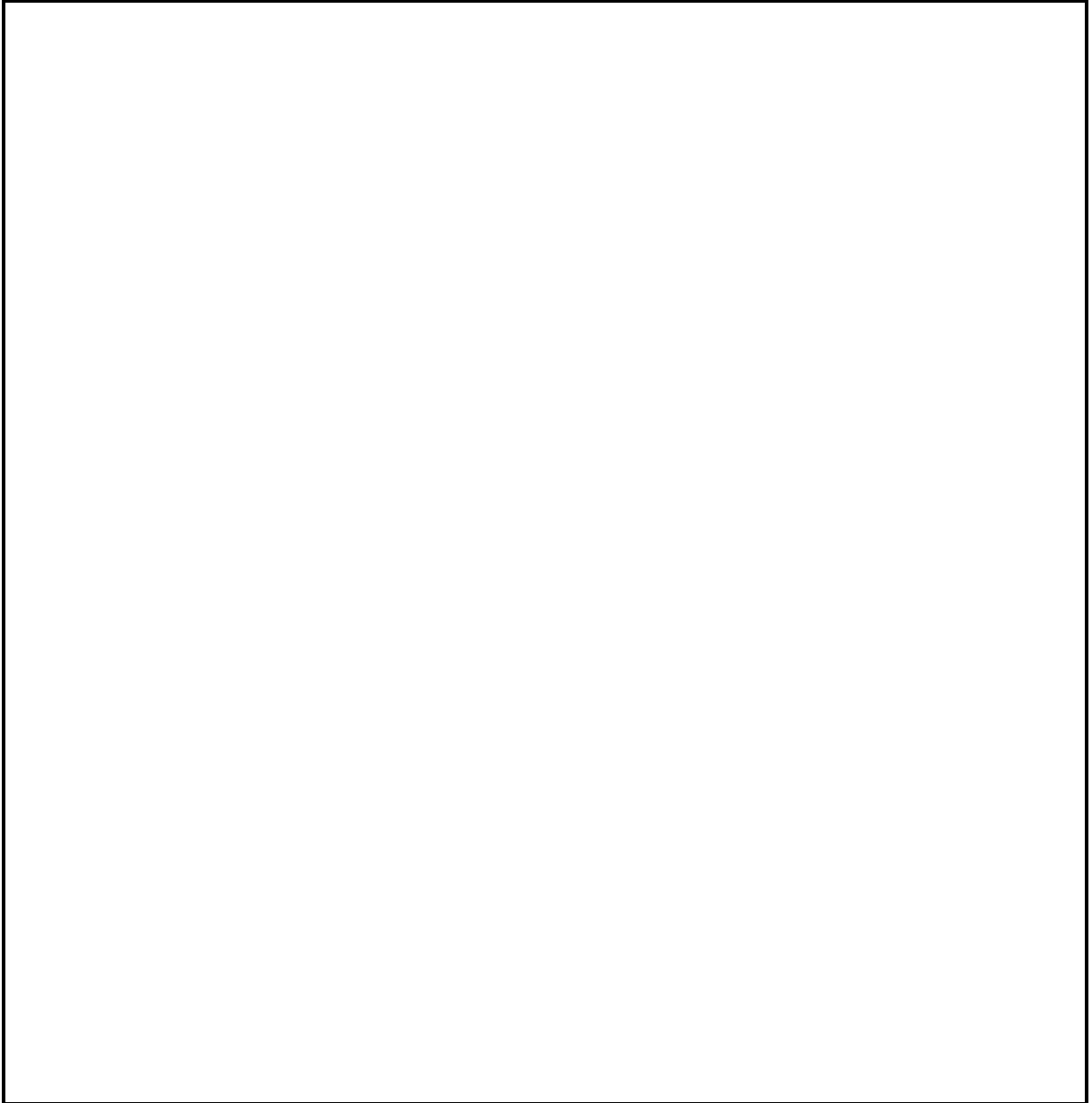
   Users may also comment on news stories. Each comment is limited to 500 characters. When submitting a comment, unregistered users must enter a special word-phrase, viewed as an image. This is to prevent spamming.

   Finally, user accounts may be banned by the website administrators if they are caught spamming — that is, submitting advertisments 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.

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

(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.

(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"*

ii. *"The system must be correct"*

iii. *"The system must be available"*

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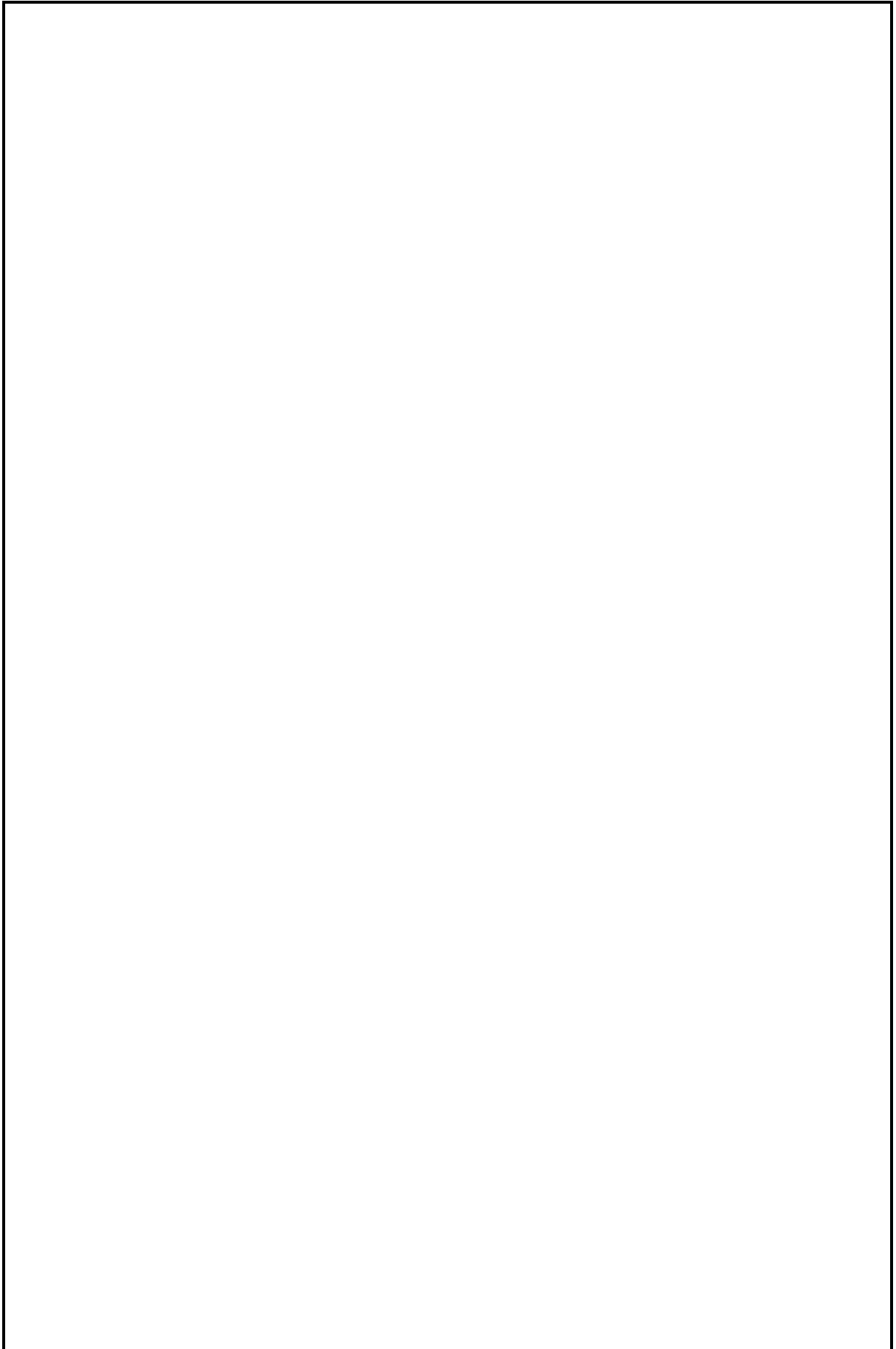
For every story submitted, the system records the submission time and date, and the account which submitted it. Likewise, every account which has voted for a story is known in order to ensure one vote per "user". Every comment is recorded, along with the account creating it.

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.
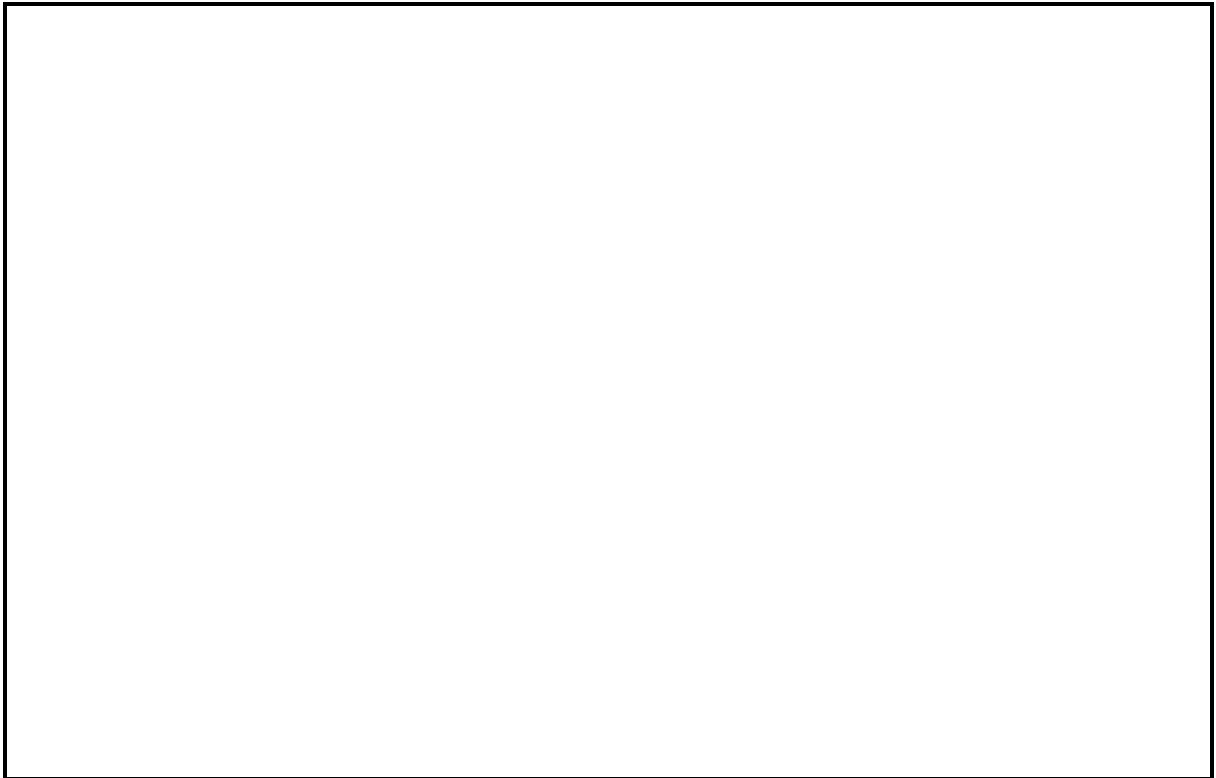

(b) [**4 marks**] Briefly discuss one important way in which the system description is *inconsistent, ambiguous* or *incomplete*.

(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"

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