

Study questions for Lecture 1 - Answers

Study questions - error categories and design paradigms

Consider the P. error categories / design paradigms. Relate any potential problems in the following to these categories.

Recall categories were the following: new concepts, scaling up, design changes with new failure modes, copying successful results, incorrect analytical model, and tunnel vision

a. Suppose that a psychologist constructs a formal model of degrees of attraction between two people, based on measurable attributes. You are told construct an automated dating system. Later on this model is found to be faulty.

**Incorrect analytical model. Possible failure to question and verify models.
Novel concept. You should construct a simulation of its use to check it out.**

b. Suppose that you are building a dating system for the class, which has less than 50 people. You decide to keep the dater information in a file of records. When a date is requested, the system sequentially reads through the file, looking for matches. The office of the university president hears about this happiness building system and decides to upbeat the atmosphere by running for all students in the UC system.

Scaling up. Do not assume that a design can be scaled up. It may be that the simple file oriented design will no longer work.

c. Consider once again the dating system. This is a full featured system where users record both their preferences and their characteristics. Both are used in date matching. It allows users to change their data at any time. Suppose that under heavy loads it starts to slow down to an unacceptable rate. One suggestion is cache requests and their responses, so that if the same user makes the same request then the results of previous request may be returned instead of redoing the match-search.

There is a potential problem wherein a user updates personal data, but it does not get recorded in the data base because it is cached. Then some user comes along and asks for a date but old data is used. Problem of new failure modes introduced by a design change.

d. During design for an international dating system, the focus is on the date matching algorithm, based on detailed physical and psychological characteristics. Later on people in California are complaining that they are getting matched up with dates that love to play tennis every morning, just like them, who live in Western Australia.

Possible tunnel vision: focusing on some important aspect such as pastimes, and forgetting critical issues such as location.

e. In your dating system, in the past you have cached user data at the terminal for the purposes of efficiency. There has never been a problem with respect to overwhelming the data transmission facilities, and you decide to cut the sizes of the caches in half.

Possible problem is there may have been no data transmission problem in the past, but there could be now. What class of error is this? It is a kind of scaling up where you are increasing the volume of data transmissions. A new data transmission clogging problem might be a new failure mode, but it is not an unexpected one.