Sample Final Exam quick solutions

1. (a) The computer should look at the middle name first (like in the battleship game from the lab); then it will be able to decide whether it should search the first or the second half of the list (and it can ignore the other half).

   (b) The middle title no longer gives any indication as to where the title we want is. So we may need to look at every one of the 1000000 books.

   (c) The baboon mating relationships is a networked data structure (baboons are not monogamous). The river system is hierarchical (small rivers merge into a larger river that merges into one larger one, etc), as is the employment structure (one president, a few vice-presidents, etc).

2. Here's one possible (rather short, since I don't have much time) answer: the program is **not** intelligent: it makes enough mistakes that it wouldn't fool the Turing test, it has no intentionality (it's purely pattern matching).

   One might however argue that it tries to predict future events, which is a part of what Hawkins and Blakeslee consider an intelligent system would do. In that sense, it's not any more stupid than a plant or an insect, which they believe exihibit a (very small) amount of "intelligence".

3. (a) To create artistic works faster than is possible by hand.

   (b) The less mature the tool is, the more technologically expert the artist needs to be.

   (c) Vector, bitmap, bitmap (because of the patterns inside the spheres; for this one, a combination of the two could actually be used, with the background being represented as a vector image).

4. (a) Yes, although the interaction with the browser might be tricky.

   (b) 5, 2, 1, 4, 3

   (c) F, F, T

(d) Assume memory location 6000 contains 7, memory location 6001 contains 4, etc, that load copies only 1 byte of memory to the register, and that the -1 in the branch instruction means to go back by one instruction (which as I've said in the review session is now how it would ever be done on a real CPU). Note that in the following table, the program counter contains the address of the next instruction (not the one that was just executed)

After Instruction	Program Counter	Reg. 0	Reg. 1	Reg. 2	Reg. 3	Reg. 4
`load r1, 6000`	1004	0	7	4	0	0
`sub r1, r2, r1`	1008	0	3	4	0	0
`branchge r1, -1`	1004	0	3	4	0	0

5. 10, length $-$ 1, 4, 15, 5, 5

6. (a)

(b) 36, 20, 18

(c) Can anyone read light-red text on a slightly-darker-red background???

(d) He/she can click on the frowny face, or on the "Click here" button.

(e) The message "I'm giving you one last chance" will be displayed.

7. (a) Because the number of machines with an IP address is about to exceed the number of available 32-bit IP addresses.

(b) Two machines might send packets continuously, and since the packets always interfere with each other, neither will ever get sent successfully.

(c) Machines whose IP addresses correspond to very large integers (in the billion range) will have to wait a very very very very long time

before retrying to send their packets. Others will be able to retry almost immediately.

8. We need to add `var url = "http://www.ubc.ca/"` before the `document.write` statement.