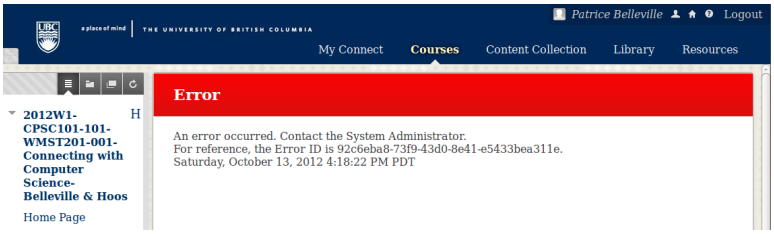
CPSC 101/WMST 201 Midterm
Friday October 19th, 2012

[9] 1. Each of the following screenshots violates one of the four interface design principles discussed in class. In each case, specify the principle that is most obviously violated ("aim for familiarity and consistency", "use well-chosen mappings and metaphors", "provide useful feedback", or "manage complexity"), and justify your choice briefly.

[3] a. Look at the position of the taps.

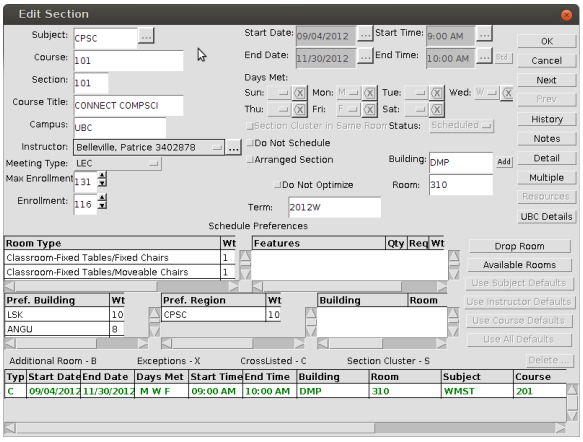
Solution : The principle violated is that of "familiarity and consistency": the hot water is *always* on the left, and the cold water is *always* on the right. In this case we swapped the two.

[3] b. I get the following message from UBC Connect when I try to grade the first pre-class quiz for a student who dropped the course.



Solution : The principle violated is that of "providing useful feedback": what am I supposed to do with such a cryptic error message???

[3] c. This is the screen used to "schedule" a section – in this case CPSC 101, section 101. The boxes in the bottom half of the window are rarely used. To be able to modify the number of seats available for students to register, one needs to click on the "UBC Details" button and go to a different screen.



Solution : The principle violated is that of "managing complexity": often used options should always be easier to access than those that are only needed infrequently.

[9] 2. Networking using TCP/IP

[3] a. If a machine A is sending a file as a number of separate packets to a machine B using the TCP/IP protocol, why is it possible, and even likely, that these packets will not arrive at machine B in the order in which they were send from machine A?

Solution : It is because the packets sent from machine A to machine B do not all follow the same route across the internet: a packet currently at a machine M will be sent using whichever route M believes is less congested.

[3] b. Suppose that one of the packets going from machine A to machine B is being stored in machine C (waiting to be sent towards machine B) when machine C is hit by a meteorite. What will machine B do when it realizes that this packet is missing?

Solution : It will send a message to machine A and ask it to resend this packet.

[3] c. Suppose that your domain name server (DNS) was machine C. Does that mean that you are now unable to connect to `www.google.com` to perform a search query? If not, how could you connect to `www.google.com` even though machine C is now in bits (literally)?

Solution : You could still connect to any machine you want (except C, of course), including `www.google.com`, but you would need to know its IP address (in this case, `173.194.79.147` would work). Of course, it is unlikely that you would know its IP address, so the fact that you *could* still connect to it is not very helpful.

[6] 3. What HTML file would result in your browser displaying the following? A list of tags is available on the last page of the examination.

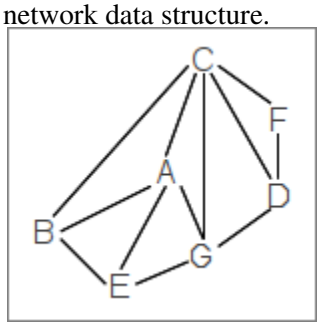
Solution :

```
<head>
    <title>Occupations</title
</head>
<body>

<h2>Occupations</h2>

<ul>
<li>Blue-collared
   <ol>
   <li>Gardener</li>
   <li>Plumber</li>
   </ol></li>
<li>White-collared
    <ol>
    <li>Banker</li>
    <li>UBC President</li>
    </ol></li>
<li>Other
    <ol>
    <li>Student</li>
    </ol></li>
</ul>

<p>Clicking <a href="http://www.cbc.ca">here</a> will take
you to www.cbc.ca.
</body>
```

[6] 4. For each of the situations described below, first state if it should be represented by a hierarchical, network or tabular data structure. Then draw the data structure corresponding to the situation. In both cases, feel free to use only the first letter of a name when you label the components of your drawing.

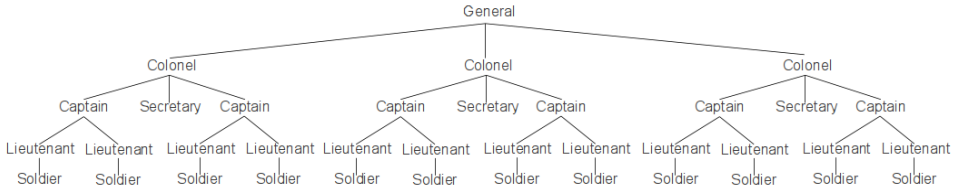
[3] a. People living on the 5th floor of the Gage residence are fairly friendly: Anglaigus is friend with Briseradius, Catédralgotix, Epidemaïs and Goudurix. Briseradius is friend with Catédralgotix and Epidemaïs. Catédralgotix is friend with Dactilograf, Faitexcus and Goudurix. Dactilograf is friend with Faitexcus and Goudurix. And finally Epidemaïs is friend with Goudurix. Assume that whenever a student x is friend with a student y, then y is also friend with x.

Solution : This is a network data structure.



[3] b. General Yveusbatr is assisted by three colonels. Each of them has a secretary and two captains to help him. Each captains orders two lieutenants around, who themselves command a single soldier (it's a very small army).

Solution : This is a hierarchical data structure.



[6] 5. Consider the following HTML document:

```
<html>
<head>
  <title>Fun with Fibonacci!</title>
  <script type="text/javascript">
  var previous = 0;
  var current = 1;

  function displaynextvalue()
  {
    var nextvalue = previous + current;
    previous = current;
    current = nextvalue;
    alert(nextvalue);
  }
  </script>
</head>
<body>
   <img id="button" src="TouchMe.png" onClick="displaynextvalue();" />
</body>
</html>
```

What value will be displayed by your browser in the alert dialog after you have clicked on

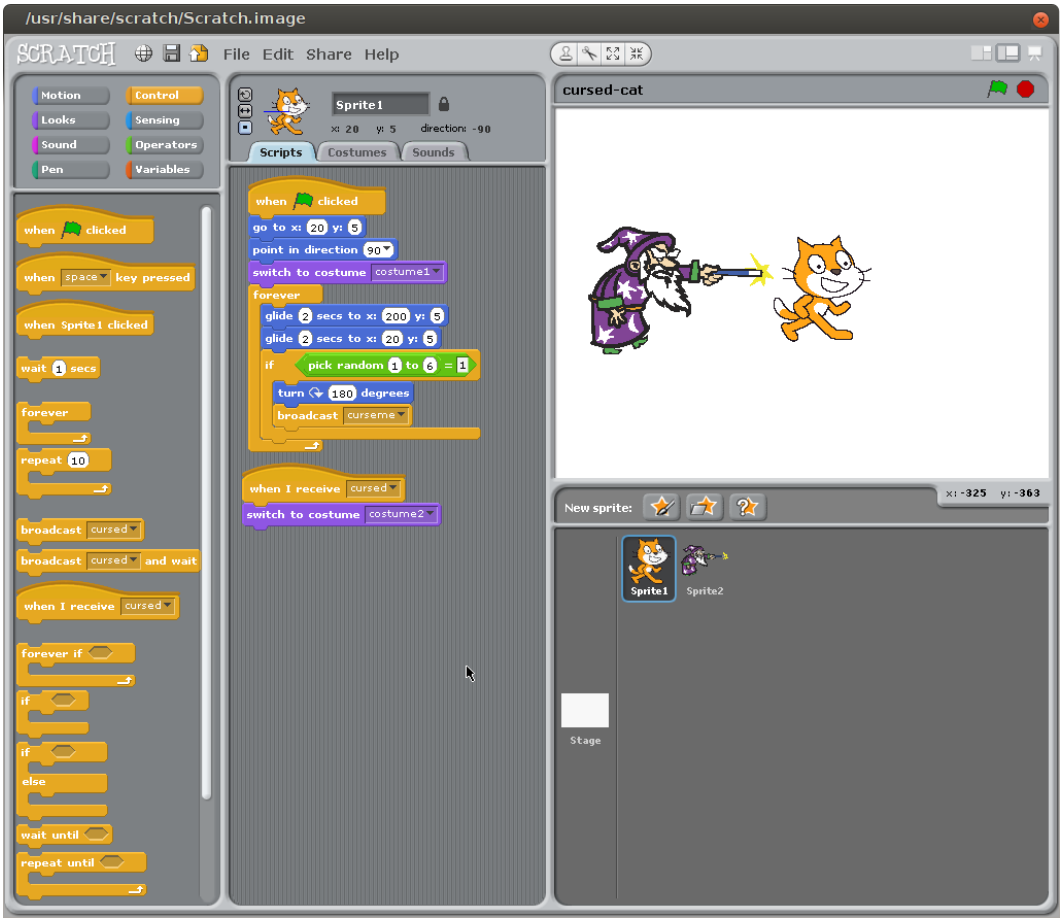
the "Touch Me" button four times? Explain how you got your answer by listing the values of the variables every time function `displaynextvalue` is called.

Solution : Initially, `previous` is 0, and `current` is 1.

- The first time function `displaynextvalue` is called, it will first set its variable `nextvalue` to $0 + 1$ which is 1. It will then assign the value 1 to `previous` and the value 1 to `current`, and display the value 1.
- The second time function `displaynextvalue` is called, it will first set its variable `nextvalue` to $1 + 1$ which is 2. It will then assign the value 1 to `previous` and the value 2 to `current`, and display the value 2.
- The third time function `displaynextvalue` is called, it will first set its variable `nextvalue` to $1 + 2$ which is 3. It will then assign the value 2 to `previous` and the value 3 to `current`, and display the value 3.
- Finally, the fourth time function `displaynextvalue` is called, it will first set its variable `nextvalue` to $2+3$ which is 5. It will then assign the value 3 to `previous` and the value 5 to `current`, and display the value 5.

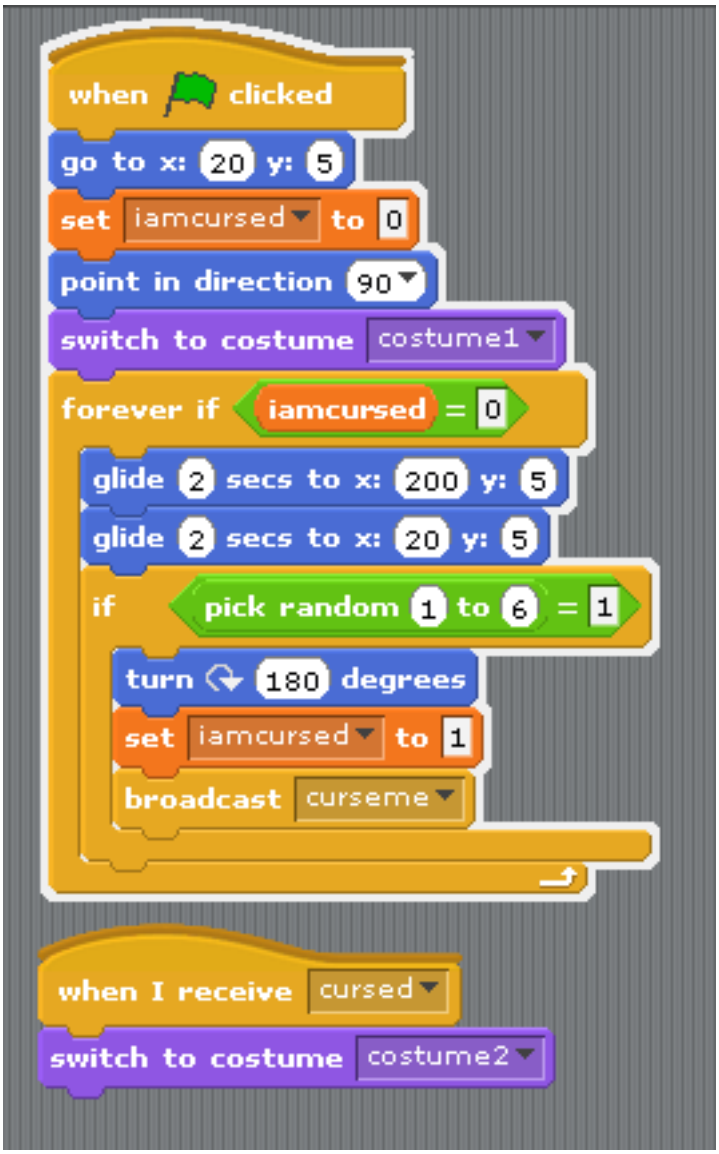
Hence the value displayed in the alert dialog the fourth time the "Touch Me" button has been clicked on will be 5.

[9] 6. In the following Scratch project, Felix the Cat is walking back and forth until the evil wizards kills him using the dreaded Avada Kedavra curse (the picture in the bottom right corner shows what Felix looks like when he is dead). Unfortunately, the project has a bug: Felix will continue gliding back and forth even after he has died.



Edit the program so that Felix stops moving once he has died. If you cannot make your edits effectively on the previous page, describe them very clearly here. **You are not allowed to use the `stop script` and `stop all` controls.** Hint: use a variable.

Solution :


when clicked
go to x: 20 y: 5
set iamcursed to 0
point in direction 90
switch to costume costume1
forever if iamcursed = 0
glide 2 secs to x: 200 y: 5
glide 2 secs to x: 20 y: 5
if pick random 1 to 6 = 1
turn 180 degrees
set iamcursed to 1
broadcast curseme
when I receive cursed
switch to costume costume2