Quiz 1

This quiz is closed book, closed notes. You have 80 minutes to complete it. Each question is worth 3 points (out of 100) unless otherwise noted.

Your name: _____

1. Memorability is one of the dimensions of usability. List the other 4 dimensions.

    learnability, efficiency, few and recoverable errors, satisfaction

2. Clerks in a law firm are observed printing hard copies from the brief filing system and making notes on them by hand. This suggests that the filing system had an incomplete:
    a. heuristic evaluation
    b. task analysis
    c. user analysis
    d. Wizard of Oz prototype

    1 point for user analysis, since it might have found that clerks prefer writing over typing

3. The Macintosh menu bar is faster than the Windows menu bar primarily because of
    a. the power law of practice
    b. task analysis
    c. perceptual fusion
    d. Fitts's Law

4. The ideal frame rate of a movie is primarily determined by the cycle time of the:
    a. perceptual processor
    b. motor processor
    c. working memory
    d. cognitive processor

5. Describe how an interface's memorability can be tested.

   (a) *By running a user test again on the same user after some time has elapsed; or (b) By quizzing the user about aspects of the interface after a user test is over*

6. Red-green color blindness is caused by:
   a. fewer rods in the fovea
   b. yellowing of the lens or aqueous humor
   c. weak S cones
   d. weak M or L cones
   e. chromatic aberration

7. Chromatic aberration affects:
   a. 8% of males
   b. Older people
   c. Tritanopes
   d. **Everybody**

8. Give one advantage of the spiral model of user interface development.

   Each iteration is cheaper than full-scale waterfall iterations;
   More iterations are possible;
   Gives early feedback about a design;
   Mitigates risk in early stages of design

9. Users of the waterfall model often end up doing iterative design anyway. Explain.

   After getting all the way through the waterfall to the final stages --- acceptance testing or even release of the software --- you discover that you missed some important requirements, or that your design is unusable. So you have to start the waterfall over again.

10. (4 points) Give an example of something that has a perceived affordance but not an actual affordance, and explain why.
A paper chair, which seems to afford sitting but doesn't hold weight;
A screenshot of a button, which seems to afford clicking but doesn't respond.

11. List the 4 memories in the model human processor.
visual image store, auditory image store, working memory, long-term memory

12. Give 2 reasons why small blue text on a dark gray background might be hard to read.
This question was trying to get at the biological basis for why small blue details with poor contrast are hard to read:
- few S cones in the fovea;
- S cones respond weakly anyway;
- lens and aqueous humor turn yellow with age;
- lens gets weaker with age
But we also accepted reasonable answers that mentioned contrast, size, fuzziness of blue, difficulty of focusing short wavelengths, or associativity of size and shape.

13. You can load a VCR tape the right way because of:
   a. physical constraints
   b. logical constraints
   c. semantic constraints
   d. cultural constraints

14. You push Play after loading the tape, rather than before, because of:
   a. physical constraints
   b. logical constraints
   c. semantic constraints
   d. cultural constraints
   1 point given for logical constraints, since playing "logically follows" loading. Calling it a semantic constraint would be more accurate, however, because this is a fact of the semantics of the VCR domain which is known only by people who understand those semantics. Logical constraints, by contrast, are effective even if the user doesn't have a clue about the domain. Imagine a naive PC user making sure every port in the back of the computer has a cable plugged into it – that's a logical constraint, because it works even if the user has no idea what the cables and ports are used for.

15. The Play button is labeled by a rightward-pointing arrow because of:
   a. physical constraints
   b. logical constraints
   c. semantic constraints
   d. cultural constraints

16. (4 points) Give an example of a mapping that is natural but not direct, and explain why.

    A turn signal stalk on a steering wheel, which signals a left or right turn by moving up and down, but the up-down movement maps naturally to the turn of the steering wheel;

    A four-burner stove with the control knobs arranged in a row and the burners arranged in an arc;

    The mouse, which moves around on the desktop plane to control a cursor on a perpendicular plane. (A touchscreen would be a direct-mapping pointing device.)

17. (5 points) Consider the vertical scroll bar of a web browser or word processor. For each of Norman's five principles below, give one way that the scrollbar uses the principle for effective design. (3 points) Describe the interface model of the scroll bar in one sentence.

    Affordance: *The thumb affords dragging; the arrow buttons afford clicking; the scrollbar track affords clicking.*

    Constraints: *The thumb is graphically constrained within the scrollbar track, so dragging motion is confined to vertical motion; the thumb can't move past the start or end of the track.*

    Mapping: *The vertical motion of the thumb has a direct mapping to the motion of the document; the positions of the arrow buttons have a direct mapping to their effect on the thumb and the document.*

    Visibility: *The position of the thumb in the track indicates the scroll position; the thumb's size (relative to the track) indicates the amount of the document in view; the presence or absence of the scrollbar indicates whether scrolling is possible.*

    Feedback: *When the thumb is dragged, the document scrolls immediately; when an arrow button is clicked, it shows depressed feedback; when the scrollbar track is clicked, it flashes.*

18. Name 3 kinds of slips.

    capture, description, mode

19. I want to email a file to a friend. I start a new message, type in the body, write my name at the end, and then press Send -- forgetting to attach the file. This is best described as:
    a. **capture error**
    b. mode error
    c. description error
    d. mistake

20. I choose a file from a list, but instead of pressing the Retrieve button to download it, I accidentally press the Remove button and delete it. This is best described as:
    a. capture error
    b. mode error
    c. **description error**
    d. mistake

21. While typing in a word processor, I press Ctrl-P intending to move the cursor up one line (as it does in Emacs), only to see the Print dialog appear instead. This is best described as:
    a. capture error
    b. **mode error**
    c. description error
    d. mistake

    1 point for capture error, since typing might encourage capture of navigation.

22. Give 2 general techniques for preventing mode errors.

    Eliminate modes;
    Make modes clearly visible;
    Make modes spring-loaded;
    Make modes temporary;
    Make action sets disjoint between modes.

23. Explain the difference between *internal* consistency and *external* consistency.

Internal consistency is the consistency between different parts of an interface; External consistency is consistency with other applications on the same platform, or with standards out in the world.

24. List the 3 Nielsen heuristics that concern errors.

Prevent errors;
Recognition, not recall;
Help users recognize, diagnose, and correct errors.

25. Which of the following problems is heuristic evaluation least likely to reveal:

    a.   A button is too small
    b.   A frequently-used command has no shortcut key
    c.   Color choices are bad for color-blind users
    d.   Many target users are illiterate

*Some said (b) because they thought the evaluator wouldn't know whether a command was frequently-used, but evaluators actually **do** realistic tasks in the course of their evaluation, when the prototype allows it. (Heuristic evaluation doesn't just happen on screenshots!) So they're likely to know what commands are important.*

26. What technique would be better than heuristic evaluation for revealing the problem that was missed in question 25?

User analysis. 1 point given for user testing if your answer was (d) above, but user analysis tends to collect more information about the user population as a whole than you can get from the few users you bring in to test. If your answer to 25 was (a) or (b), full credit given for user testing.

27. Which of the following problems is paper prototyping least likely to reveal:
    a.   A dialog box is missing a Cancel button.
    b.   Status bar messages go unnoticed.
    c.   Users don't expect to find the Sort command on the Tools menu.
    d.   A CD case is a poor metaphor for a CD player.

Some said (a) because missing escape routes are hard to notice when you're evaluating a static screenshot – but a paper prototype isn't static, it's actually used.

28. Give 3 reasons why paper is an effective prototyping tool in the early stages of design.

    Cheap to make;
    Fast to make;
    Easy to change;
    Easy to throw away;
    Helps designers think more creatively;
    Nonprogrammers can help;
    Sketchiness makes users give more constructive feedback

29. Give one important similarity and one important difference between paper prototyping and Wizard of Oz prototyping.

    Similarity: human is pretending to be a computer.
    Difference: paper prototyping shows the interface on paper, Wizard of Oz shows it on a computer.

30. List 7 visual variables.

    size, position, orientation, texture, value, hue, shape

31. (4 points) Ben Bitdiddle is designing the style sheet for his thesis, which will be printed in color. He decides to make his section headings red and his subsection headings blue, but otherwise identical. Ben justifies his decision by appealing to a graphic design guideline. Which one?

    Simplicity (or reduction, or regularization).

    1 point given for Emphasize Contrast, but he isn't emphasizing it very well.

    What's wrong with his choice of visual variable?

    Hue is not an ordered variable, but sections and subsections have an ordering relationship.

    1 point for appealing to color guidelines, e.g. blue text is hard to read, or red and blue together cause eyestrain.

    Color blindness is not relevant here, since red-blue colorblindness doesn't exist.

32. Which target is fastest to reach with the mouse starting at location M? Assume that
    you can move your hand equally well in all directions, and that none of the targets is
    near a screen edge.
    a. A *(D/S = 1 1/3)*
    b. B *(D/S = 2)*
    c. C *(D/S = 1 1/8)*
    d. D *(D/S = 2 1/2)*