

## **Design Principles And Usability Heuristics**

**You can avoid common design pitfalls by following these rules-of-thumb for design**

**You can inspect an interface for usability problems by applying these same principles**

James Tam

## **Design Principles And Usability Heuristics**

**Broad “rules of thumb” that describe features of “usable” systems**

### **Design principles**

- Broad usability statements that guide a developer’s design efforts
- Derived by evaluating common design problems across many systems

### **An evaluation tool**

- Same principles used to “evaluate” a system for usability problems
- Becoming very popular
  - User involvement not required
  - Catches many design flaws

James Tam

## Design Principles And Usability Heuristics (Advantages)

### **Discount usability engineering**

- A few general guidelines can correct for the majority of usability problem
- Easily remembered, easily applied with modest effort
- Cheap and fast way to inspect a system
- Can be done by:



Double experts



Usability experts



End users

James Tam

## Design Principles And Usability Heuristics (Weaknesses)

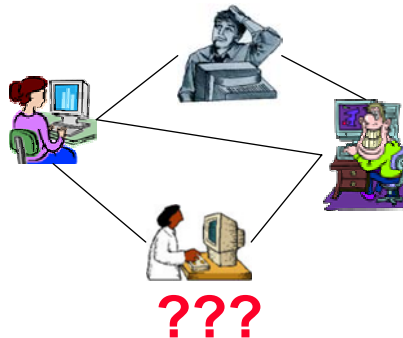
### **Principles are more or less at the motherhood level**

- Can't be treated as a simple checklist
- Subtleties involved in their use
- Example:

Heuristics for a  
single user



Heuristics for many  
collaborating users



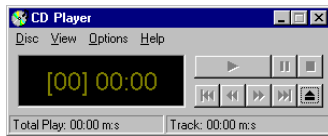
James Tam

# 1. Simple And Natural Dialogue

Use the user's conceptual model

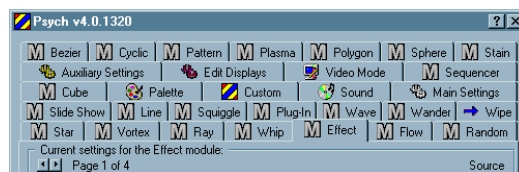
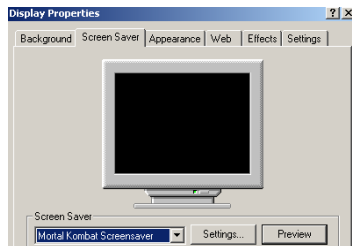
Match the users' task in as natural a way as possible

- Minimize mapping between interface and task semantics



James Tam

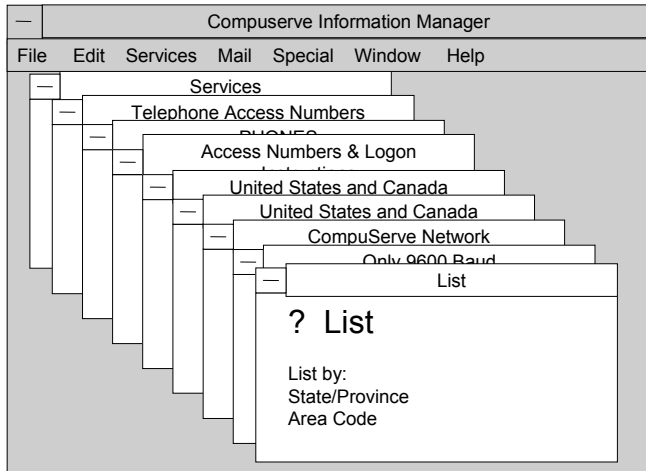
# 1. Simple And Natural Dialogue



James Tam

# 1. Simple And Natural Dialogue

## Menu or window? Which window?



James Tam

# 1. Simple And Natural Dialogue

## Present exactly the information the user needs when it is needed

- Less is more
  - Less to learn, to get wrong, to distract...
- Remove or hide irrelevant or rarely needed information
  - Competes with important information on screen
- Information should appear in natural order
  - Order of accessing information matches user's expectations
  - Related information is graphically clustered
- Minimize or mitigate modes
- Use windows frugally
  - Don't make navigation and window management excessively complex

James Tam

**Dr. Drugs Pharmacy Master**

## Davison, Thomas

**Edit Customer**
**New Customer**

**First Name:** Thomas      **Alberta Health Care #:** 45688-3357  
**Last Name:** Davison      **Doctor:** Jane Yang  
**Address:** 4 BRADEN CRS NW      **Insurer:** FARMERS INSURANCE AGE  
**City:** Prudhoe      **Policy #:** 4215487-56  
**Province:** Alberta      **Notes:**  
**Postal Code:** F4T6H8  
**Phone Number:** 403 282-9759

### Prescriptions

**See List View**
**Edit Prescription**
**New Prescription**

Alprazolam	Jan	Feb
Citalopram	Feb	Mar
Ranitidine	Mar	Apr
Folic Acid	Jun	Jul
Levothyroxine	Jul	Aug
Celecoxib	Oct	Nov
Omeprazole	Nov	Dec

1999 < Year > 2001 | Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

**Good: Info in the same place**

By previous 481 students Brant LeClerc, Lloyd Yoon, Amy Yang James Tam

**Dr. Drugs Pharmacy Master**

**First Name:**       **Alberta Health Care #:**   
**Last Name:**       **Doctor:**   
**Address:**       **Insurer:**   
**City:**       **Policy #:**   
**Province:**       **Notes:**   
**Postal Code:**   
**Phone Number:**

**Save**
**Cancel**

### Prescriptions

**See List View**
**Edit Prescription**
**New Prescription**

Alprazolam	Jan	Feb
Citalopram	Feb	Mar
Ranitidine	Mar	Apr
Folic Acid	Jun	Jul
Levothyroxine	Jul	Aug
Celecoxib	Oct	Nov
Omeprazole	Nov	Dec

1999 < Year > 2001 | Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

**Good: Info in the same place**  
**Bad: Special edit mode**

By previous 481 students Brant LeClerc, Lloyd Yoon, Amy Yang (with permission) James Tam

Dr. Drugs Pharmacy Master

## Davison, Thomas

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Dr. Drugs Pharmacy Master

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**Postal Code:** F4T6H8  
**Phone Number:** 403 282-9759

### Prescriptions

Drug Name   
 Manufacturer       Doctor   
 Quantity       Units   
 Price/Unit       Refill Quantity

**Good: Stable parts of the window**  
**Bad: Prescriptions separate from graphics**

By previous 481 students Brant LeClercq, Lloyd Yoon, Amy Yang (with permission) James Tam

Dr. Drugs Pharmacy Master

**Davison, Thomas** Add Undo

**First Name:** Thomas  
**Last Name:** Davison  
**Address:** 4 BRADEN CRS NW  
**City:** Prudhoe  
**Province:** Alberta  
**Postal Code:** F4T6H8  
**Phone Number:** 403 282-9759

**Health Care #:** 45688-3357  
**Doctor:** Jane Yang  
**Insurer:** FARMERS INSURANCE AGE  
**Policy #:** 4215487-56  
**Notes:**

**Prescriptions** New Prescription

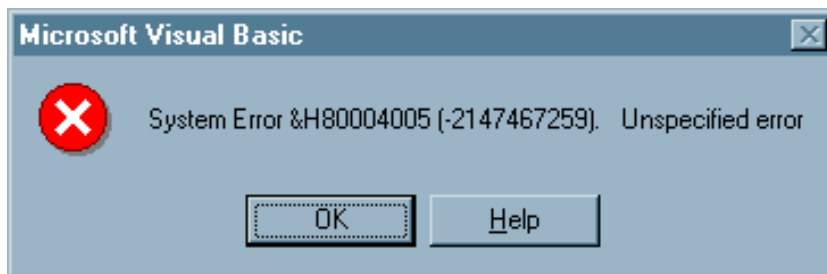
Alprazolam  
 Citalopram  
 Ranitidine  
 Folic Acid  
 Levohydroxine  
 Celecoxib  
 Omeprazole

1999 <Year> 2001 | Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

collapsed onto one screen (needs formatting)  
 Double click to edit (mode buttons gone)  
 Click to get info

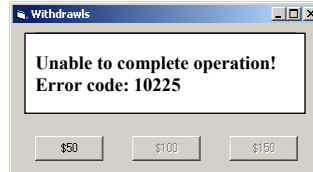
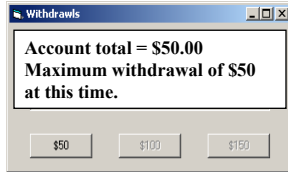
By previous 481 students Brant LeClerc, Lloyd Yoon, Amy Yang (with permission) James Tam

## 2. Speak The User's Language



## 2. Speak The User's Language

### Terminology based on users' language for task



### Use meaningful mnemonics, icons, and abbreviations

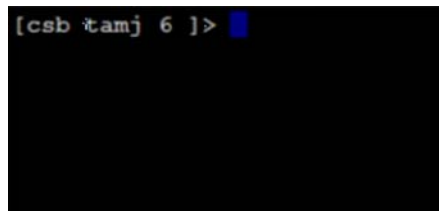
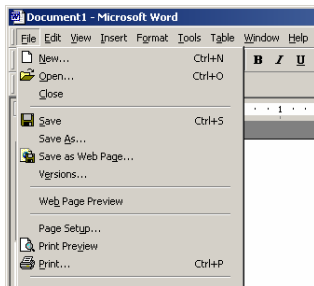
- eg File / Save
  - Ctrl + S (abbreviation)
  - Alt FS (mnemonic for menu action)
  - Open folder (tooltip icon)



James Tam

## 3. Minimize The User's Memory Load

- Describe required the input format, use examples, provide default inputs
- Promote recognition over recall



James Tam

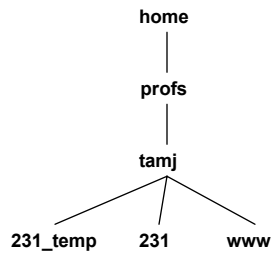


### 3. Minimize The User's Memory Load

Small number of rules applied universally

File
11110000
01010101

Remove  
what?



James Tam

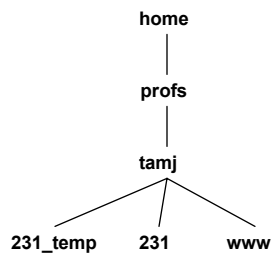
### 3. Minimize The User's Memory Load

Small number of rules applied universally

File
11110000
01010101

Remove  
what?

rm file name



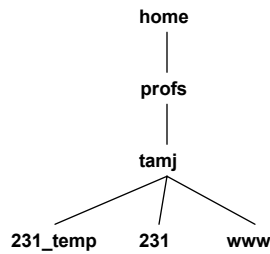
James Tam

### 3. Minimize The User's Memory Load

Small number of rules applied universally

File
11110000
01010101

Remove  
what?



James Tam

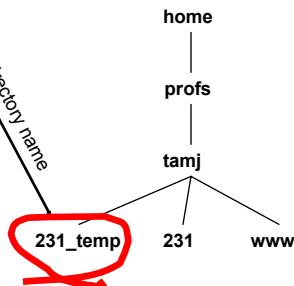
### 3. Minimize The User's Memory Load

Small number of rules applied universally

File
11110000
01010101

Remove  
what?

*mail directory name*



James Tam

## 4. Be Consistent

### Consistency of effects

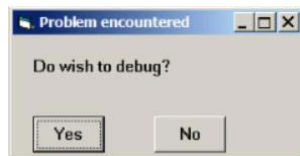
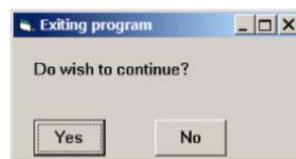
- Same words, commands, actions will always have the same effect in equivalent situations
- Makes the system more predictable
- Reduces memory load

James Tam

## 4. Be Consistent

### Consistency of language and graphics

- Same information/controls in same location on all screens / dialog boxes forms follow boiler plate
- Same visual appearance across the system (e.g. widgets)



James Tam

## 4. Be Consistent

These are labels with a raised appearance.

Is it any surprise that people try and click on them?

The image shows a web form with a grey background and a white border. At the top is a button labeled 'Subscriber'. Below it are two rows of labels and input fields: 'Name:' followed by a text box, and 'Account #:' followed by a text box. To the right of these are labels 'Tech. Re' and 'Status:'. Below these are two more rows: 'Telephone:' followed by a text box, and 'Address:' followed by a text box. To the right of these are labels 'E-Mail:' and 'St'. At the bottom are two buttons: 'Save' and 'Cancel'. The form has a slightly raised, 3D appearance.

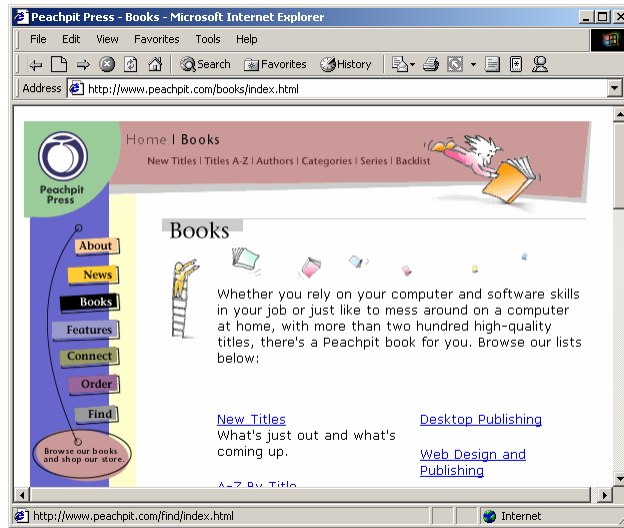
James Tam

## 4. Be Consistent

The image shows a screenshot of a Microsoft Internet Explorer browser window. The title bar reads 'Peachpit Press - Features: Tips on Designing Web Pages - Microsoft Internet Explorer'. The address bar shows 'http://www.peachpit.com/features/hndmonth/webpages.html'. The page content includes a navigation menu on the left with buttons for 'About', 'News', 'Books', 'Features', 'Connect', 'Order', and 'Find'. The main content area has a heading 'Tips on Designing Web Pages' by Robin Williams, followed by a sub-heading 'Excerpted from Adobe's The Non-Designer's Guerrilla Marketing CD'. The text discusses consistency and clarity in web design. On the right, there are 'Related Links' including 'Bad/Good Design', 'Checklists from The Non-Designer's Web Book', and 'Design Principles from...'. The browser's status bar at the bottom shows 'http://www.peachpit.com/features/excerpt/index.html' and 'Internet'.

James Tam

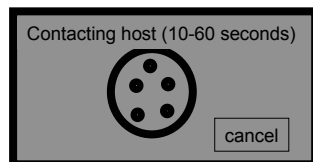
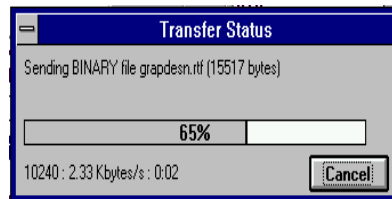
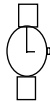
## 4. Be Consistent



James Tam

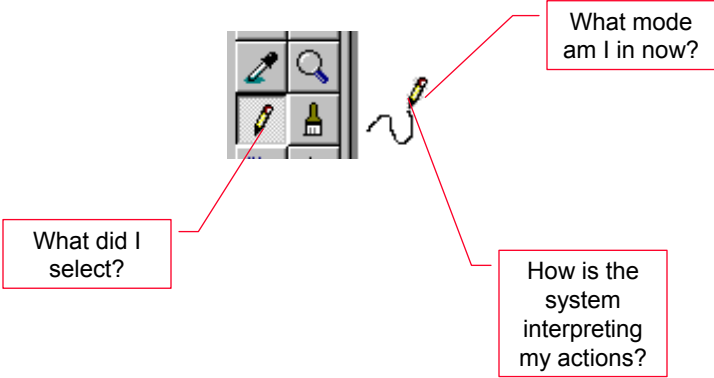
## 5. Provide Feedback

What is the program doing?



James Tam

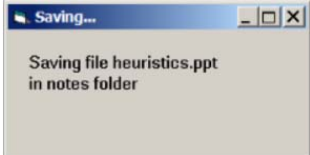
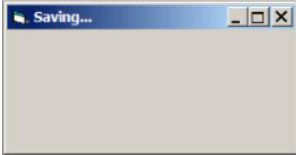
# 5. Provide Feedback



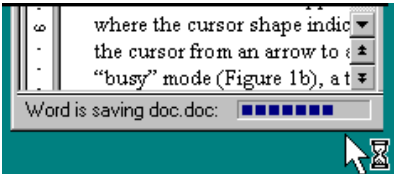
James Tam

# 5. Provide feedback

Should be as specific as possible, based on user's input



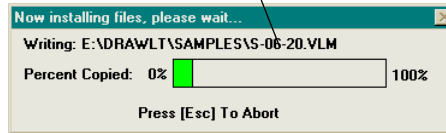
Best within the context of the action



James Tam

## 5. Provide feedback

Multiple files being copied,  
but feedback is file by file.



*Drawing Board LT*

James Tam

## 5. Provide feedback

### Feedback response time

- How users perceive delays

Delay	Effect
$0 \leq \text{delay} \leq 0.1$ seconds	Delay not noticed (system appears to operate instantaneously)
$0.1 < \text{delay} \leq 1$ second	Delay noticed but train of thought remains uninterrupted
$1 < \text{delay} \leq 10$ seconds	Delay noticed but person can still remain focused on the system
Delay $> 10$ seconds	Person wants to do something else while waiting for the system

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## 6. Provide Clearly Marked Exits



James Tam

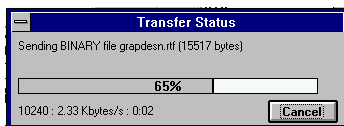
## 6. Provide Clearly Marked Exits

### Universal Undo/Redo

- e.g., <Ctrl>-<Z> and <Ctrl> <Y>

### Progress indicator & Interrupt

- Length operations

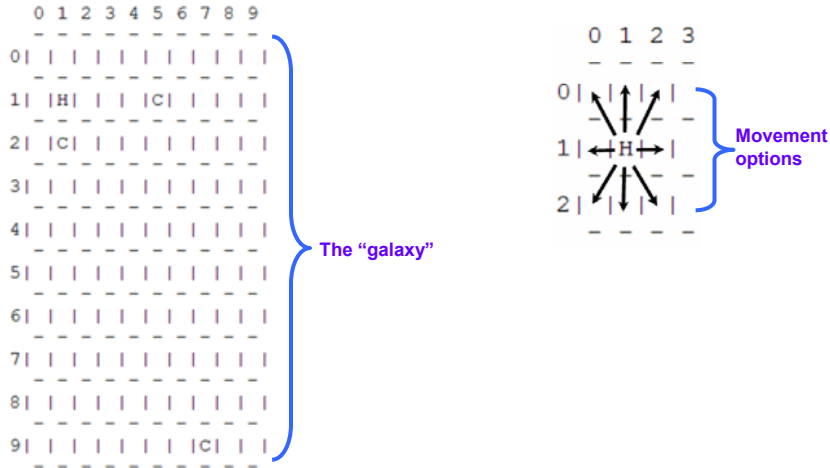


James Tam



## 6. Provide Clearly Marked Exits

**Example: A text-based space simulation game**



James Tam

## 6. Provide Clearly Marked Exits

```
do
{
    insideGalaxy = isEmpty = withinRange = true;
    System.out.print("Enter the destination row (0 - 9): ");
    row = Console.in.readInt();
    System.out.print("Enter the destination column(0 - 9): ");
    column = Console.in.readInt();
    if ((row < 0) || (row > (Galaxy.SIZE-1)) || (column < 0) || (column > (Galaxy.SIZE-1)))
    {
        insideGalaxy = false;
        System.out.println("You cannot move outside the galaxy");
    }
} while ((insideGalaxy == false) || (isEmpty == false) || (withinRange == false));
```

Loop while input is invalid

James Tam

## 6. Provide Clearly Marked Exits

```
do
{
    insideGalaxy = isEmpty = withinRange = true;
    System.out.print("Enter the destination row (0 - 9, -1 to pass): ");
    row = Console.in.readInt();

    if (row == -1)
    {
        System.out.println("You have chosen not to move your ship.");
        break;
    }
    System.out.print("Enter the destination column(0 - 9, -1 to pass): ");
    column = Console.in.readInt();
    :
    :
} while ((insideGalaxy == false) || (isEmpty == false) || (withinRange == false));
```

Allow the user an option to opt out

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## 6. Provide Clearly Marked Exits

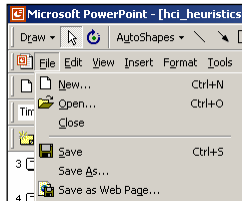
### Restoring defaults

- Getting back original settings

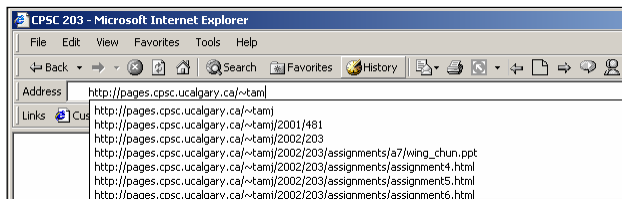


## 7. Provide Shortcuts

### Keyboard accelerators



### Name completion



James Tam

## 7. Provide Shortcuts

### Experienced users should be able to perform frequently used operations quickly

- Type-ahead (entering input before the system is ready for it)
- Navigation jumps
  - e.g., going to window/location directly, and avoiding intermediate nodes
- History systems
  - WWW: ~60% of pages are revisits



James Tam

Keyboard accelerators for menus

Customizable toolbars and palettes for frequent actions

Split menu, with recently used fonts on top

Double-click raises toolbar dialog box

Double-click raises object-specific menu

Scrolling controls for page-sized increments

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## 8. Deal With Errors In A Helpful And Positive Manner

People will make errors!

Errors we make

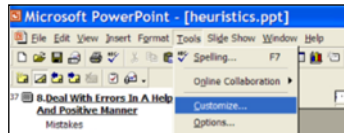
- Mistakes
- Slips



## 8. Deal With Errors In A Helpful And Positive Manner

### Mistakes

- Arise from *conscious deliberations* that lead to an error instead of the correct solution



### Slips

- *Unconscious behavior* that gets misdirected en route to satisfying goal
- Shows up frequently in skilled behavior
  - Usually due to inattention
- Often arises from similarities of actions

```
[csb 481 16 ]> rm *
rm: remove file1 (yes/no)? y
rm: remove file2 (yes/no)? y
rm: remove file3 (yes/no)? y
rm: remove file4 (yes/no)? y
rm: remove file5 (yes/no)?
```

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## Types Of Slips

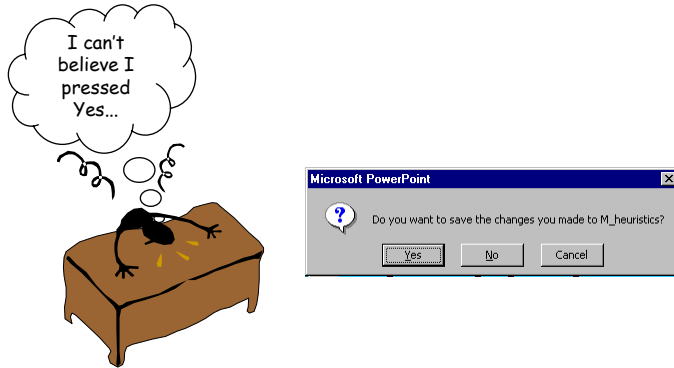
- 1) Capture error
- 2) Description error
- 3) Loss of activation
- 4) Mode error

James Tam

## Types Of Slips: Capture Error

### Frequently done activity “captures” the intended activity

- Occurs when common and rarer actions have same initial sequence
- “Force of habit results in the slip”



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## Types Of Slips: Description Error

### Intended action has much in common with others that are possible

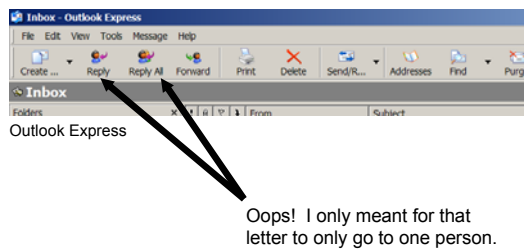
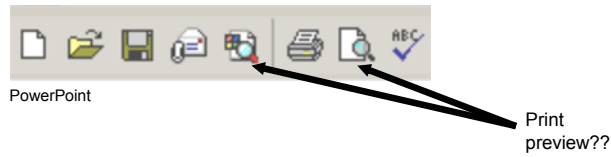
- Usually occurs when right and wrong objects physically near each other
- “Perform the right action but on the wrong object”
  - e.g., Pour juice into bowl instead of glass



www.baddesigns.com

James Tam

## Types Of Slips: Description Error (2)



James Tam

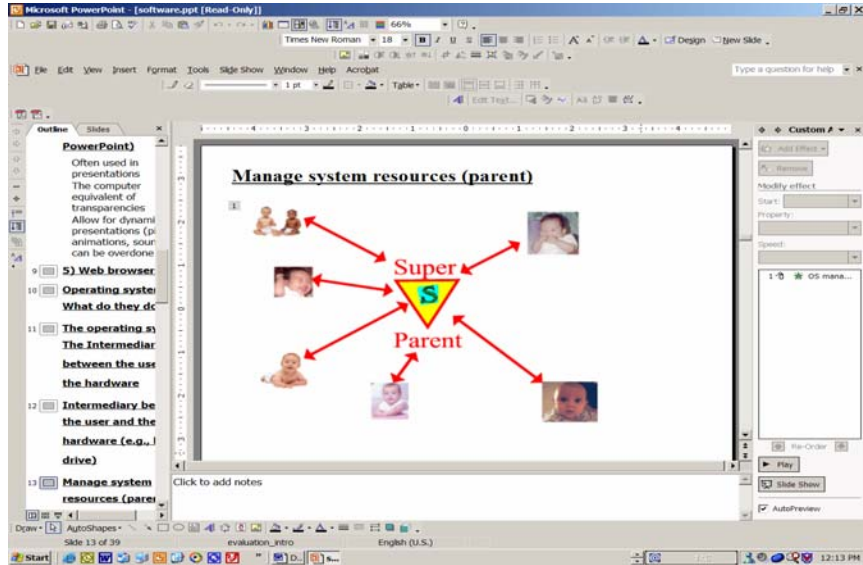
## Types Of Slips: Loss Of Activation

### **Loss of activation**

- Forgetting what the goal is while undergoing the sequence of actions
  - e.g., Start going to room and forget why you are going there
- “What the heck was I doing again?”
- Misordering a sequence

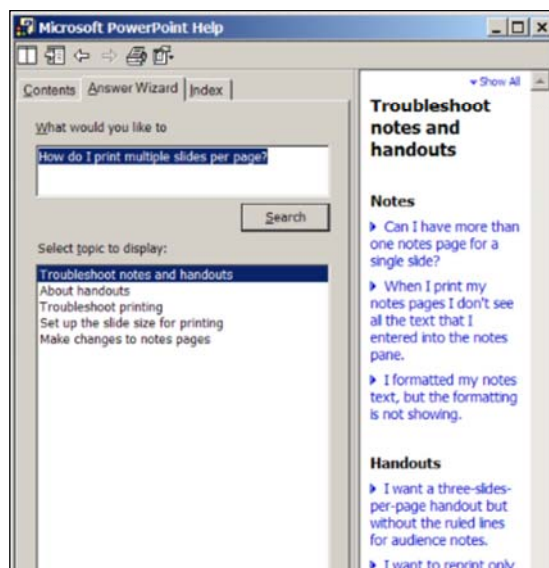
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## Loss Of Activation



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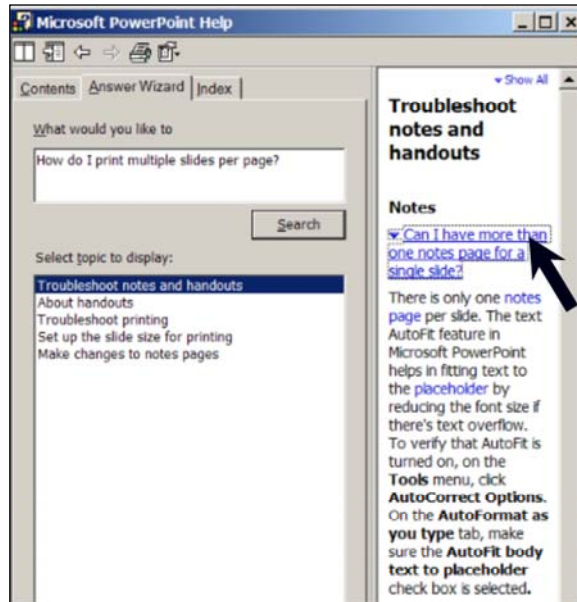
## Loss Of Activation (2)



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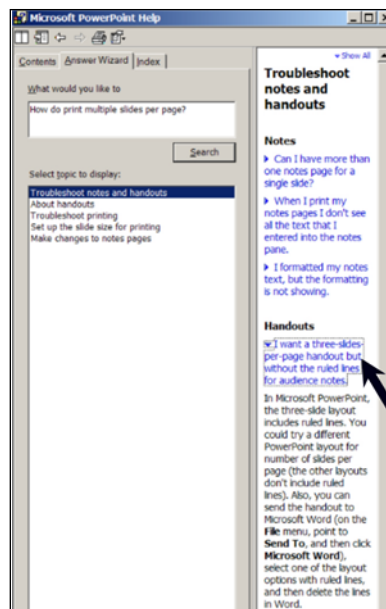


## Loss Of Activation (3)



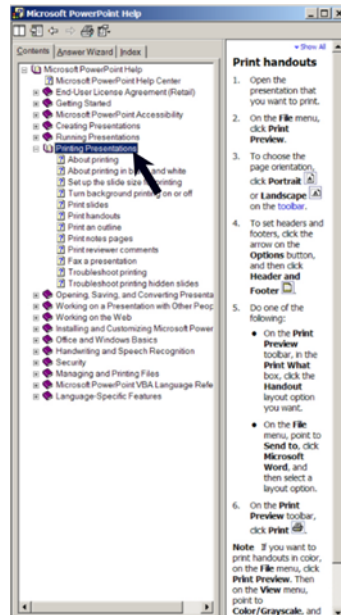
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## Loss Of Activation (4)



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## Loss Of Activation (5)



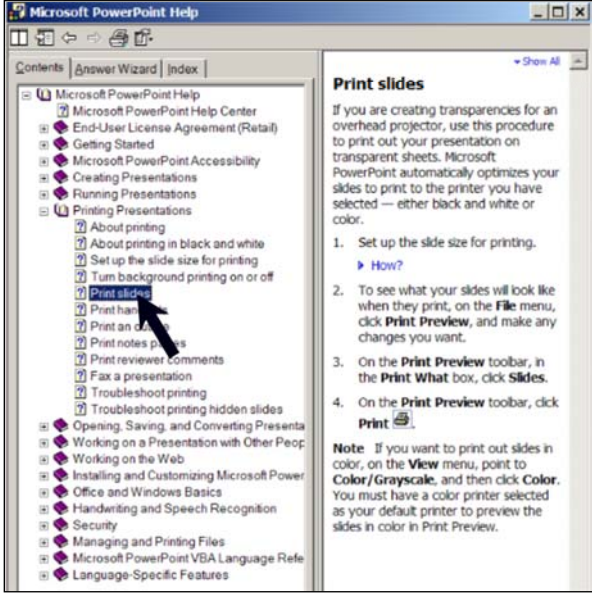
James Tam

## Loss Of Activation (6)



James Tam

## Loss Of Activation (7)



The screenshot shows the Microsoft PowerPoint Help window. The 'Contents' pane on the left is expanded to 'Printing Presentations', and 'Print slides' is selected. The main pane displays the 'Print slides' article, which includes a list of steps and a note. A black arrow points to the 'Print slides' link in the Contents pane.

**Print slides**

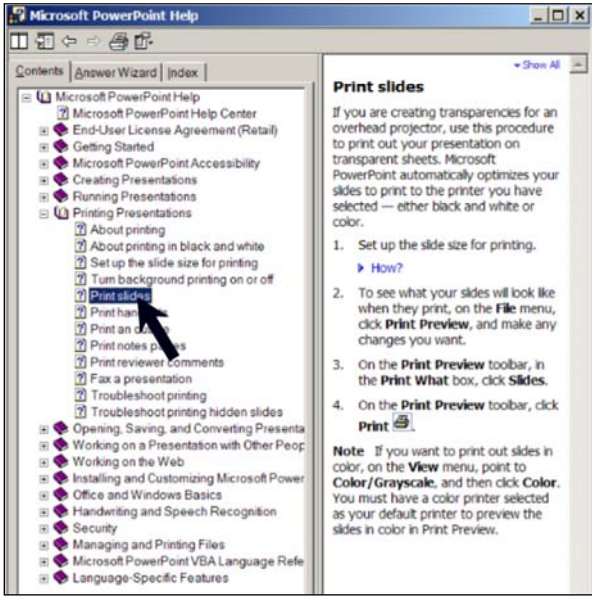
If you are creating transparencies for an overhead projector, use this procedure to print out your presentation on transparent sheets. Microsoft PowerPoint automatically optimizes your slides to print to the printer you have selected — either back and white or color.

1. Set up the slide size for printing.  
▶ [How?](#)
2. To see what your slides will look like when they print, on the **File** menu, click **Print Preview**, and make any changes you want.
3. On the **Print Preview** toolbar, in the **Print What** box, click **Slides**.
4. On the **Print Preview** toolbar, click **Print**.

**Note** If you want to print out slides in color, on the **View** menu, point to **Color/Grayscale**, and then click **Color**. You must have a color printer selected as your default printer to preview the slides in color in Print Preview.

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## Loss Of Activation (7)



The screenshot is identical to the one above, showing the 'Print slides' article in the Microsoft PowerPoint Help window. A black arrow points to the 'Print slides' link in the Contents pane. To the right of the screenshot is a cartoon illustration of a man sitting at a desk with a computer, looking confused with a question mark above his head.

**Print slides**

If you are creating transparencies for an overhead projector, use this procedure to print out your presentation on transparent sheets. Microsoft PowerPoint automatically optimizes your slides to print to the printer you have selected — either back and white or color.

1. Set up the slide size for printing.  
▶ [How?](#)
2. To see what your slides will look like when they print, on the **File** menu, click **Print Preview**, and make any changes you want.
3. On the **Print Preview** toolbar, in the **Print What** box, click **Slides**.
4. On the **Print Preview** toolbar, click **Print**.

**Note** If you want to print out slides in color, on the **View** menu, point to **Color/Grayscale**, and then click **Color**. You must have a color printer selected as your default printer to preview the slides in color in Print Preview.

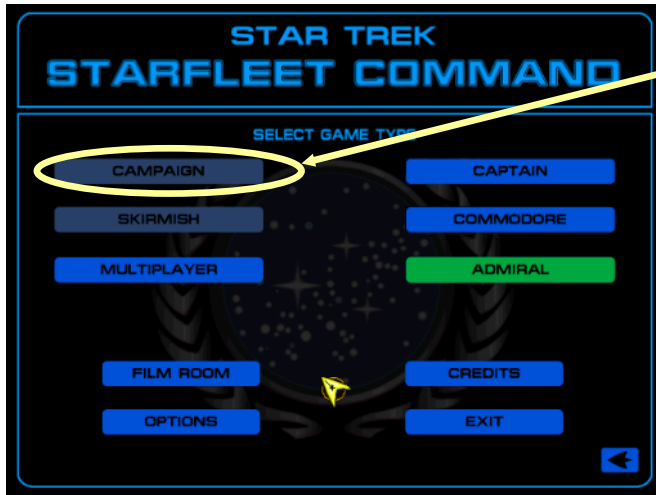
What was I trying to do again???

James Tam

## Types Of Slips: Mode Error

### Mode errors

- People do actions in one mode thinking they are in another mode



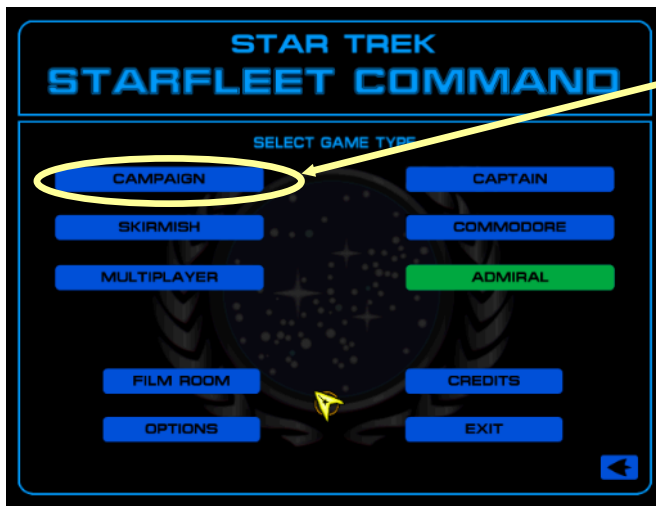
Game is in multiplayer mode only (cannot load saved games)

James Tam

## Types Of Slips: Mode Error (2)

### Mode errors

- People do actions in one mode thinking they are in another mode



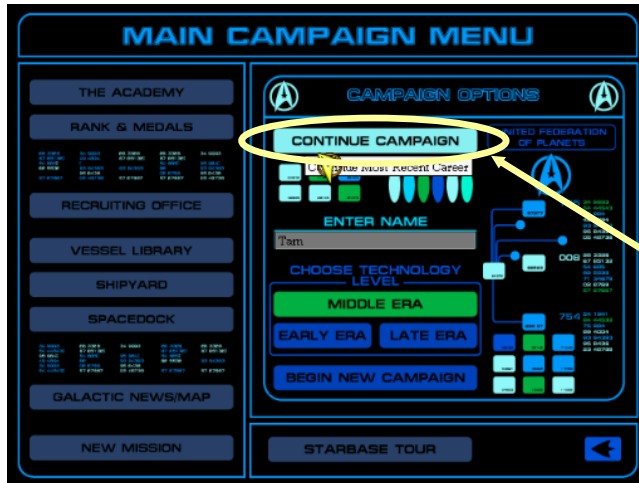
Game is single and multiplayer mode (can start new campaigns or load existing games)

James Tam

## Types Of Slips: Mode Error (3)

### Mode errors

- People do actions in one mode thinking they are in another mode



In this mode it is possible to load a game

James Tam

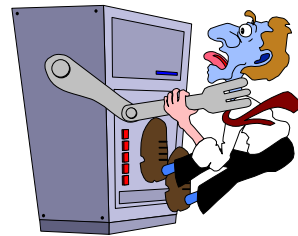
## Designing For Slips

### General rules

- Prevent slips before they occur
- Detect and correct slips when they do occur
- User correction through feedback and undo

### Examples

- Capture errors
  - One action captures another
  - Allow actions to be undone rather than asking for confirmations
- Description errors
  - Correct action on the wrong object
  - Make objects look physically distinctive and/or far apart
- Loss of activation
  - Forgot goal
  - If system knows goal, make it explicit
  - If not, allow person to see path taken or shorten steps
- Mode errors
  - Mistake modes
  - Have as few modes as possible (preferably none)
  - Make modes highly visible



James Tam

## Generic System Responses For Errors

### General idea: Forcing functions

- Prevent / mitigate continuation of wrongful action
  - e.g., range selection for dynamic queries

### Gag

- Deals with errors by preventing the user from continuing
  - e.g., cannot get past login screen until correct password entered

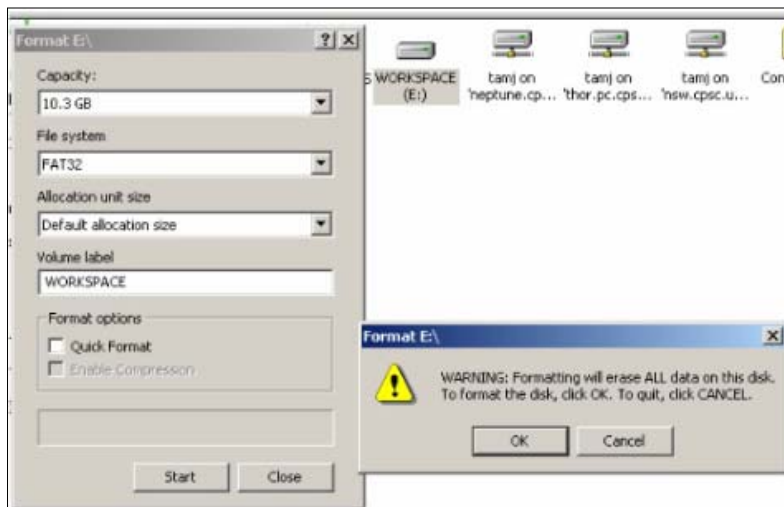
### Warn

- Warn people that an unusual situation is occurring
- Better than nothing but when overused, becomes an irritant
  - e.g., audible bell, alert box

James Tam

## Generic System Responses For Errors (2)

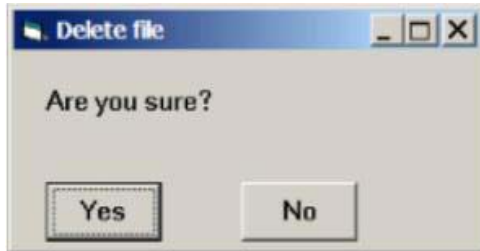
### Warning (probably needed)



James Tam

## Generic System Responses For Errors (3)

**Warning (can get annoying)**



James Tam

## Generic System Responses For Errors (4)

### **Do nothing**

- Illegal action just doesn't do anything
- User must infer what happened
  - e.g., enter letter into a numeric-only field (key clicks ignored)
  - e.g., put a file icon on top of another file icon (returns it to original position)

### **Self-correct**

- System guesses legal action and does it instead - but leads to a problem of trust
  - e.g., spelling checkers

### **Lets talk about it**

- System initiates dialog with user to come up with solution to the problem
  - e.g., compile error brings up offending line in source code

James Tam

## Generic System Responses For Errors (5)

### **Teach me**

- System asks user what the action was supposed to have meant
- Action then becomes a legal one

James Tam

## Error Handling In “The Good Ole Days”

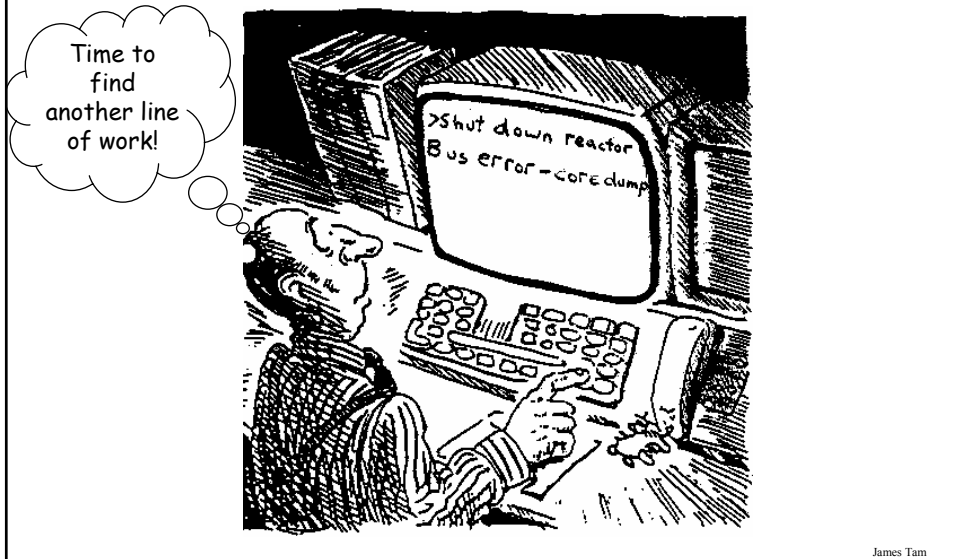


*What is "error 15762"?*

James Tam



## Errors: Don't Make Things Seem Worse Than They Really Are



## Rules Of Thumb For Error Messages

- 1. Polite and non-intimidating**
  - Don't make people feel stupid
    - Try again, bonehead!
- 2. Understandable**
  - Error 25
- 3. Specific**
  - Cannot open this document
  - Cannot open "chapter 5" because the application "Microsoft Word" is not on your system
- 4. Helpful**
  - Cannot open "chapter 5" because the application "Microsoft Word" is not on your system. Open it with "Teachtext" instead?

## Examples Of Dealing With Errors In A Positive And Helpful Manner

### Prevent errors

- Try to make errors impossible
- Modern widgets: only “legal commands” selected, or “legal data” entered

A screenshot of a dialog box titled 'Form1'. It contains a 'Date:' label followed by a text input field. Below this, there are three separate input fields for 'Month', 'Day', and 'Year'. The 'Month' field is set to 'May', 'Day' to '22', and 'Year' to '1997'. Below these, there are three dropdown menus for 'Month', 'Day', and 'Year', with 'May', '22', and '1997' selected respectively.

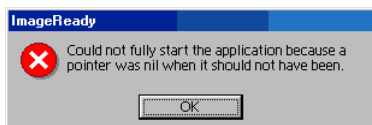
A screenshot of a dialog box titled 'Appointment'. It has tabs for 'General', 'Attendees', 'Notes', and 'Planner'. The 'General' tab is active. It shows 'Start:' as '8:30AM' and 'End:' as '4:30PM', both with dropdown arrows. The date is 'Wed 5 /14 /97'. There is an 'All day' checkbox. Below this is a 'Description:' field with 'Smart Technology Sen'. To the right is a calendar for 'May 1997' with the 14th highlighted. At the bottom, there is a 'Where:' field with a dropdown arrow.

### Provide reasonableness checks on input data

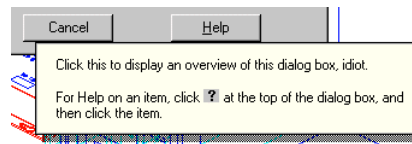
- On entering order for office supplies
  - 5000 pencils is an unusually large order. Do you really want to order that many?

James Tam

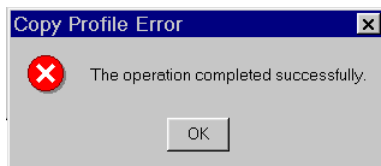
## Examples Of Bad Error Messages



Adobe's *ImageReady*



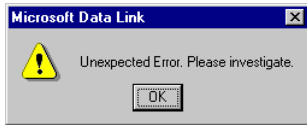
*AutoCAD Mechanical*



Microsoft's *NT Operating System*

James Tam

## Examples Of Bad Error Messages (2)



James Tam

## Examples Of Bad Error Messages (3)

A screenshot of a Microsoft Support Services web page. The page has a blue header with "Microsoft Product Support Services" and "Canada" on the left, and "All Products | Support | Search | microsoft.com Guide" on the right. Below the header is a navigation bar with "Home | Search | FAQ | Downloads | Newsgroups | Contact Us | Français" and "Send | Print | Help". The main content area has a title "Error Message: Your Password Must Be at Least 18770 Characters and Cannot Repeat Any of Your Previous 30689 Passwords (Q276304)". Below the title is a section "The information in this article applies to:" followed by a bulleted list of Windows versions. A section titled "SYMPTOMS" contains a paragraph describing the error and a red error message: "Your password must be at least 18770 characters and cannot repeat any of your previous 30689 passwords. Please type a different password. Type a password that meets these requirements in both text boxes." Below this is a "NOTE" section.

James Tam

## 9. Provide Help

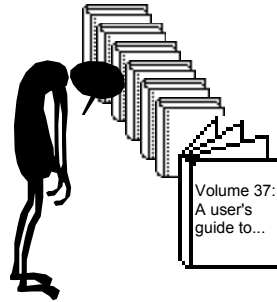
**Help is not a replacement for bad design!**

### **Simple systems:**

- Walk up and use; minimal instructions

### **Most other systems:**

- Feature rich
- Some users will want to become “experts” rather than “casual” users
- Intermediate users need reminding, plus a learning path (novice to advanced)



James Tam

## Documentation And How It's Used

### **Many users do not read manuals**

- Prefer to spend their time pursuing their task
- Paper manuals unavailable in many businesses!
  - e.g. single copy locked away in system administrator's office

### **Typical usage scenarios:**

- Usually used when users are in some kind of panic, need immediate help
  - Indicates need for online documentation, good search/lookup tools
  - Online help can be specific to current context
- Sometimes used for quick reference
  - Syntax of actions, possibilities...
  - List of shortcuts ...

James Tam

# Types Of Help

## Reference Manuals

## Reminders

- Reference cards
- Keyboard templates

## Context-sensitive help

- Tool tips
- What's this (Balloon help)

## Wizards

## Tips

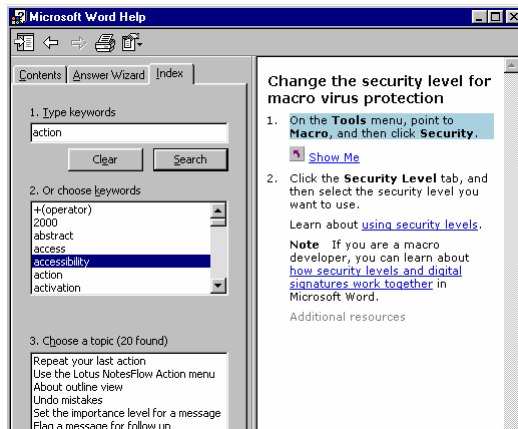
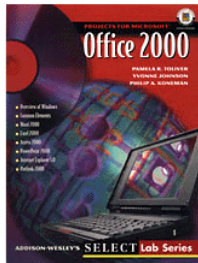
James Tam

# Reference Manuals

## Traditional form of help

## Detailed

## Paper or online



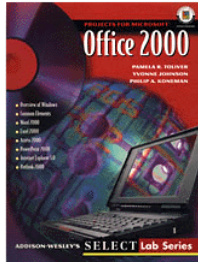
James Tam

## Reference Manuals

**Traditional form of help**

**Detailed**

**Paper or online**



**Microsoft Word Help**

**Security**

Security Level | Trusted Sources

**High.** Only signed macros from trusted sources will be allowed to run. Unsigned macros are automatically disabled.

**Medium.** You can choose whether or not to run potentially unsafe macros.

**Low (not recommended).** You are not protected from potentially unsafe macros. Use this setting only if you have virus scanning software installed, or you are sure all documents you open are safe.

No virus scanner installed.

OK    Cancel

Change the security level for virus protection

In the **Tools** menu, point to **Macro**, and then click **Security**.

[Show Me](#)

Click the **Security Level** tab, and then select the security level you want to use.

Learn about [using security levels](#).

**Note** If you are a macro developer, you can learn about [low security levels and digital signatures work together](#) in Microsoft Word.

Additional resources

James Tam

## Reminders

**Short reference cards**

- Expert user who just wants to check facts
- Novice who wants to get overview of system's capabilities

<p style="text-align: center; color: red; font-weight: bold; background-color: black; color: white; padding: 2px;">WEAPONS</p> <p>Fire ..... Spacebar</p> <p>Select Weapon/Group ..... Enter</p> <p>Chain-Fire/Group-Fire Toggle ..... \</p> <p>Alpha Strike ..... P</p> <p>Add Weapon to Group 1-5 ..... Shift+1-5</p> <p>Fire Group 1, 2, 3 ..... Num Lock, /, * (Keypad)</p> <p>Fire Current Group ..... ;</p> <p>Jettison Ammunition ..... K</p>	<p style="text-align: center; color: red; font-weight: bold; background-color: black; color: white; padding: 2px;">HUD SYSTEMS</p> <p>Cycle through Multi-Function Display ..... F1</p>
<p style="text-align: center; color: red; font-weight: bold; background-color: black; color: white; padding: 2px;">TARGETING</p> <p>Cycle Through All Targets ..... T</p> <p>Previous Target ..... R</p> <p>Target Nearest Enemy ..... E</p> <p>Target Friendly (Lancemate) ..... F</p> <p>Target Object Underneath Reticle ..... Q</p> <p>Inspect Targeted Object ..... I</p> <p>Targeting OFF ..... Ctrl+T</p>	<p style="text-align: center; color: red; font-weight: bold; background-color: black; color: white; padding: 2px;">DISPLAYS</p> <p>Radar Display (Normal/Full Screen/OFF) ..... F2</p> <p>Damage Display ..... F5</p> <p>HTAL (Head/Torso/Arms/Legs)</p> <p>Armor Damage Report ..... F6</p> <p>Enable/Disable/Save/HUD ..... F11</p> <p>Remove Cockpit ..... U</p> <p>Objectives/Briefing Summary ..... F12</p>
	<p style="text-align: center; color: red; font-weight: bold; background-color: black; color: white; padding: 2px;">CAMERAS</p> <p>Target View ..... F4</p> <p>Rear View ..... F7</p> <p>Down View ..... F8</p> <p>Weapon View ..... F9</p> <p>Weapon View (Full Screen, After Launch) ..... F10</p>

## Reminders (2)

### Keyboard templates

- Shortcuts/syntactic meanings of keys; recognition vs. recall;

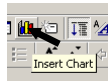


From "Gunship" © Microprose

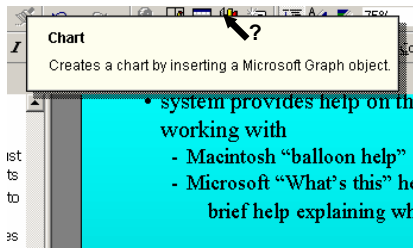
James Tam

## Context-Sensitive Help

### Tool tips

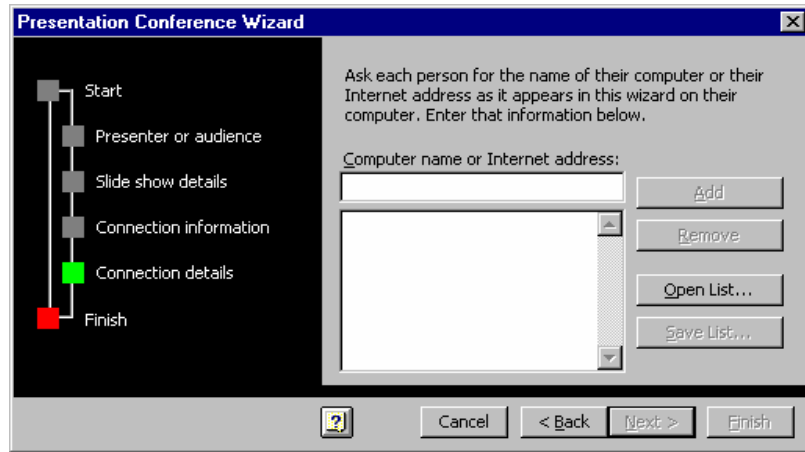


### What's this (Windows) or Balloon help (Mac)



James Tam

## Wizards




James Tam

## Tips


### Advanced features

#### Point out incorrect use



Change Awareness

- What is change awareness
- Why is it an important area of study
- Issues in change awareness
- Future work



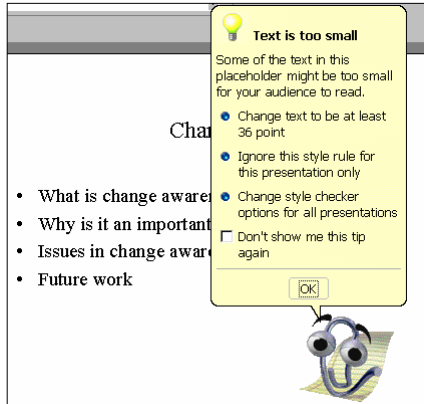
James Tam



# Tips

## Advanced features

### Point out incorrect use



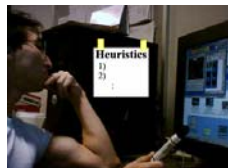
James Tam

## Conducting A Heuristic Evaluation

It's a compromise between extensive style guides and intuition-based inspections



Style guides



Heuristic evaluation

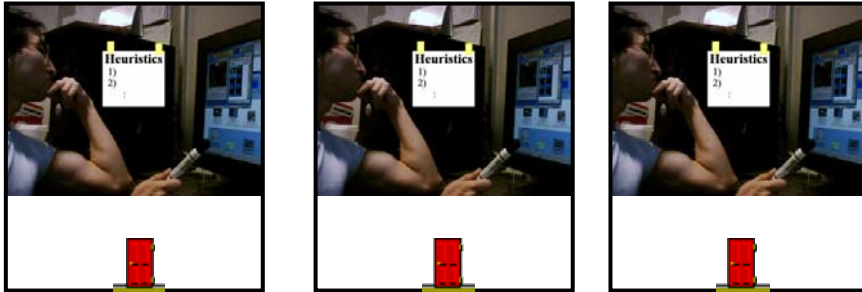


Inspections

James Tam

## Conducting A Heuristic Evaluation (2)

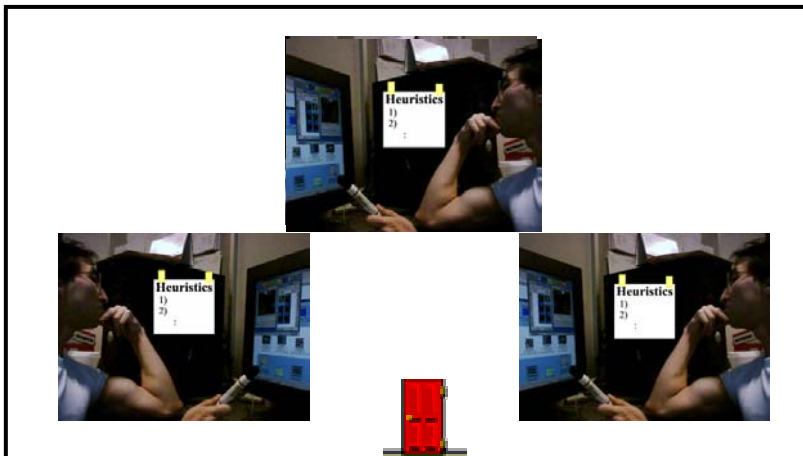
- Employ a small set of evaluators (3–5) examine interface using heuristics as a structure
- Each person evaluates the system according to the heuristics individually (~1 – 2 hours)



James Tam

## Conducting A Heuristic Evaluation (3)

- After this bring the evaluators together to pool/compare their results

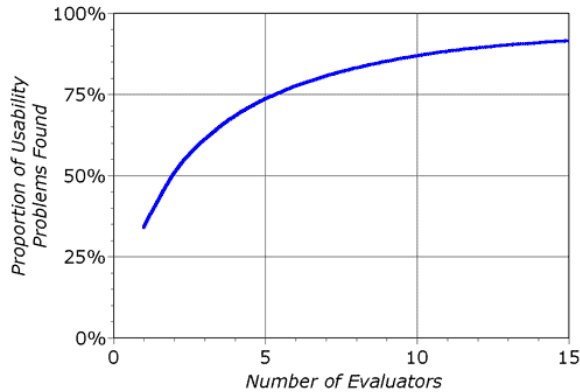


James Tam

## Conducting A Heuristic Evaluation (4)

### Benefits of group evaluations

- Single evaluator only catches ~35% of usability problems
- 5 evaluators catch ~75%



Statistics from "Usability Engineering" by Jakob Nielsen

James Tam

## Heuristic Evaluations: Who Should/Could Conduct Them

### Interface experts



### End users



### Software development team



© 1999 EB0Y  
STARLET DELUXE

### Double experts



James Tam

## Heuristic Evaluations: Types Of Systems To Evaluate

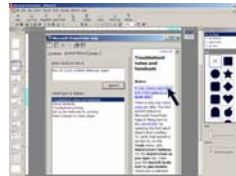
### Low fidelity paper prototypes



### Medium fidelity prototypes



### Completed systems



James Tam

## Other Guidelines: Style Guides

### Guidelines published by producers of graphical user interfaces (GUIs)

- Examples:
  - Open Software Foundation MOTIF
  - Open Look
  - MS Windows
  - Apple

### Describes the “look and feel” of the GUI

- e.g. Open Look
  - Grouping items in the same menu:
    - Use white space between long groups of controls on menus or in short groups when screen real estate is not an issue

### Good, but hard too follow

- GUI and widget specific
- Vast number of guidelines
- May miss fundamental design principles

James Tam

## Example Pages From Motif Style Guide, Release 1.1

### **Message Dialogs**

#### **Description**

MessageDialogs should be used to convey a message to the user. They must not interrupt the user's interaction with the application. They should include a message, and one of the following button arrangements.

- OK
- OK Help
- OK Cancel
- OK Cancel Help
- Yes No
- Yes No Help
- Yes No Cancel
- Yes No Cancel Help
- Cancel
- Cancel Help
- Retry Cancel
- Retry Cancel Help

#### **Related Information**

For more information, see the reference pages for DialogBox, ErrorDialog, InformationDialog, QuestionDialog, WorkingDialog, and WarningDialog

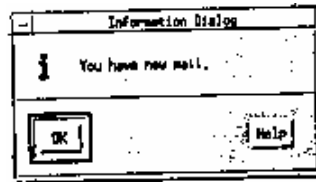
### **Information Dialog**

#### **Description**

An InformationDialog should be used to convey information the the user. It must not interrupt the user's interaction with the application. It should include an information symbol, a message, and one of the following button arrangements.

- OK
- OK Help

#### **Illustration**



#### **Related Information**

For more information, see the reference page for DialogBox

James Tam

## Other Guidelines: Widget-level “Guides”

### **Toolkit “hard-wires” guidelines**

- Repertoire of widgets
- Look & feel of particular widgets
- Easier to use defaults than to re-invent the wheel!

### **Some toolkits**

- Look & feel is programmer-settable or platform-dependent

### **Advantages:**

- Easy to be consistent
- Widgets developed by experts (e.g., graphical designers)

### **Disadvantages**

- Can be hacked around
- Interfaces “assembled” by non-interface designers can still be terrible

James Tam

## **You Now Know**

### **Nine principles of design**

- Simple and natural dialog
- Speak the user's language
- Minimize user's memory load
- Be consistent
- Provide feedback
- Provide clearly marked exits
- Provide shortcuts
- Deal with errors in a positive manner
- Provide help

James Tam

## **You Now Know (2)**

### **Heuristic evaluation**

- Principles can be used to systematically inspect the interface for usability problems

**Style guides are mostly platform-dependant design principles**

**Widget-level guidelines are built into the widgets themselves**

James Tam

