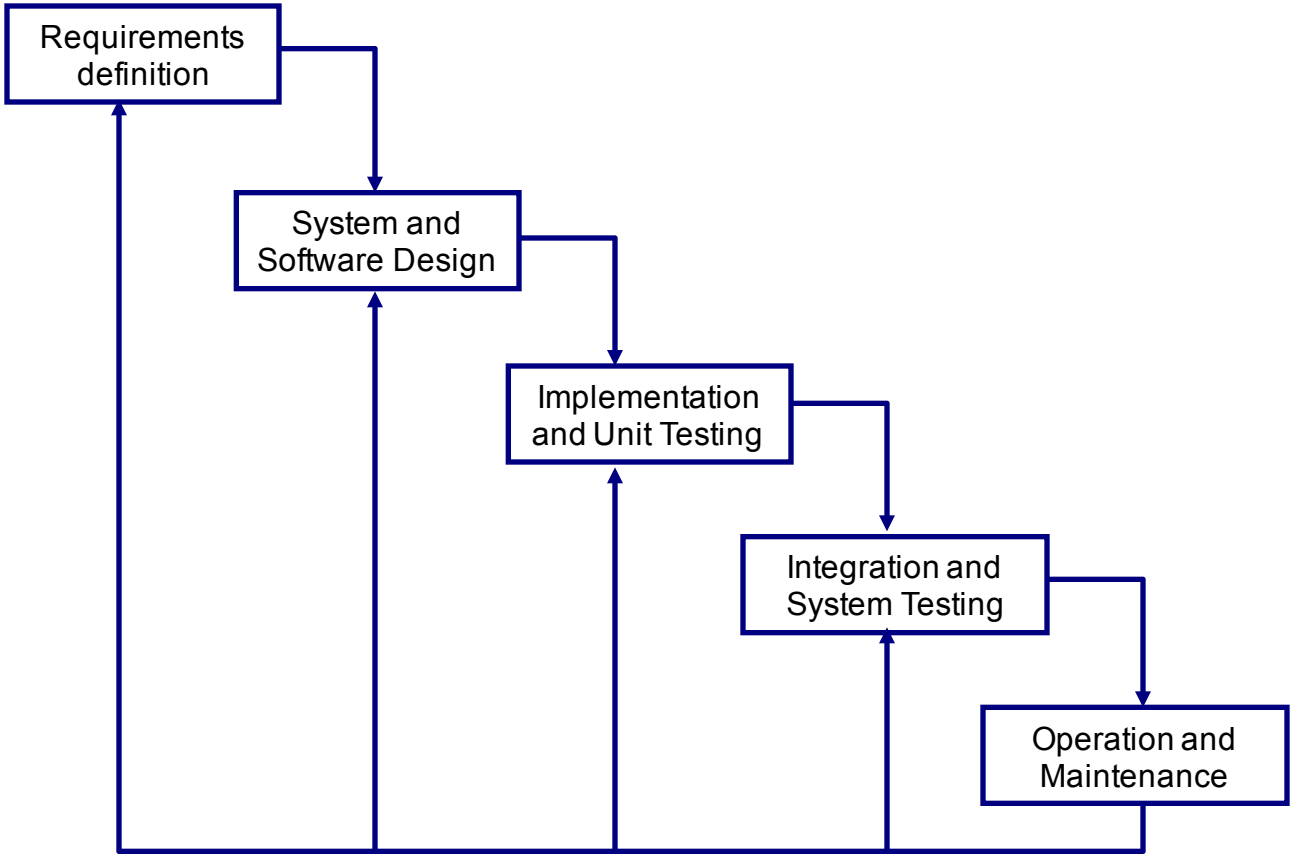
UI Design Processes

8/3/2017

Outline

- UI Design processes
  - Waterfall model
  - Iterative design
  - Spiral model
  - User-centered design
- UI Design principles and rules
- UI Hall of Fame or Shame

Waterfall Model



- Disadvantage: difficult to handle changes

Waterfall Model Problems

- Users are not involved in evaluation until acceptance testing
- UI problems result in changes in requirements and design
  - Waste of effort spent earlier
- Inflexible partitioning of the project into distinct stages
  - it is difficult to respond to changing customer requirements
- It is only appropriate when the requirements are well-understood
  - Few business systems have stable requirements

Shneiderman's Interactive Systems Lifecycle

Software development lifecycle for interactive systems:

1. Collect Information
2. Define Requirements and Semantics
3. Design Syntax and Support Facilities
4. Specify Physical Devices
5. Develop Software
6. Integrate System and Disseminate to Users
7. Nurture the User Community
8. Prepare Evolutionary Plan

Shneiderman's Interactive Systems Lifecycle

1. **Collect Information**
   - Organize the design team
   - Obtain management and customer participation
   - Conduct interviews with users
   - Submit written questionnaires to users
   - Estimate development, training, usage, maintenance costs
   - Prepare a schedule with observable milestones and reviews
2. **Define requirements and semantics**
   - Define high-level goals and middle-level requirements
   - Consider task flow sequencing alternatives
   - Create task objects and actions
   - Obtain management and customer agreement on goals, requirements, and semantic design

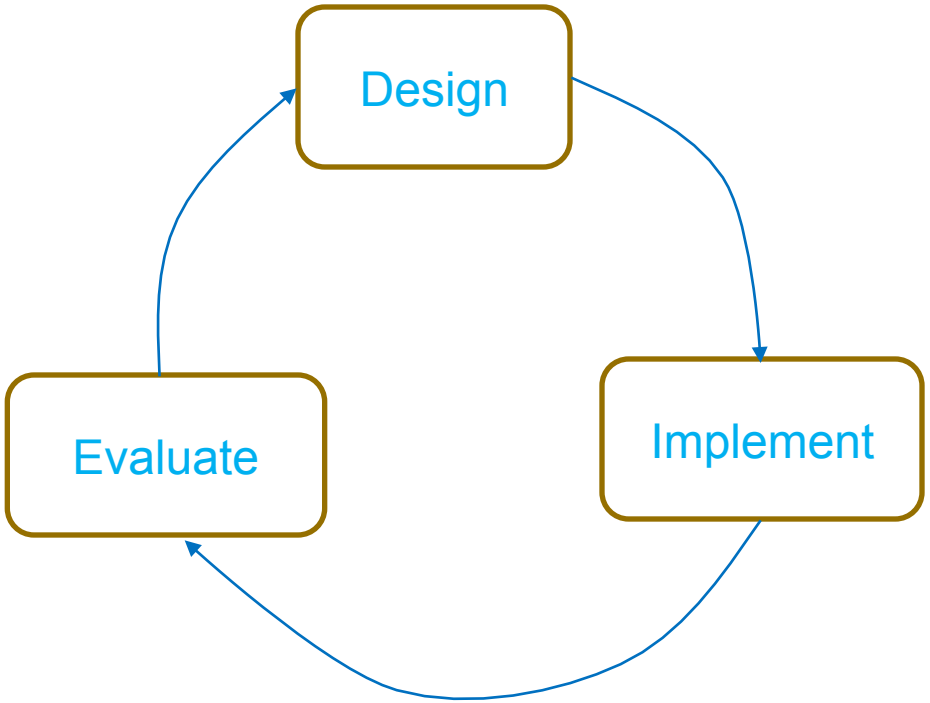
Shneiderman's Interactive Systems Lifecycle

3. **Design syntax and support facilities**
   - Compare alternative display formats
   - Design informative feedback for each operation
   - Review, evaluate, and revise design specifications
   - Carry out paper-and-pencil pilot tests or field studies with an online mock-up or prototype
4. **Specify physical devices**
   - Choose hard- or softcopy devices
   - Select audio, graphics, or peripheral devices
   - Consider work environment noise, lighting, table space, etc.
   - Carry out further pilot tests and revise design

Shneiderman's Interactive Systems Lifecycle

5. **Develop software**
   - Use appropriate development tools
   - Develop code
   - Perform unit test
6. **Integrate system and disseminate to users**
   - Assure user involvement at every stage
   - Conduct acceptance tests and fine tune the system
   - User documentation and training
7. **Nurture the user community**
   - User support
   - Monitor usage and measurement
8. Prepare evolutionary plan

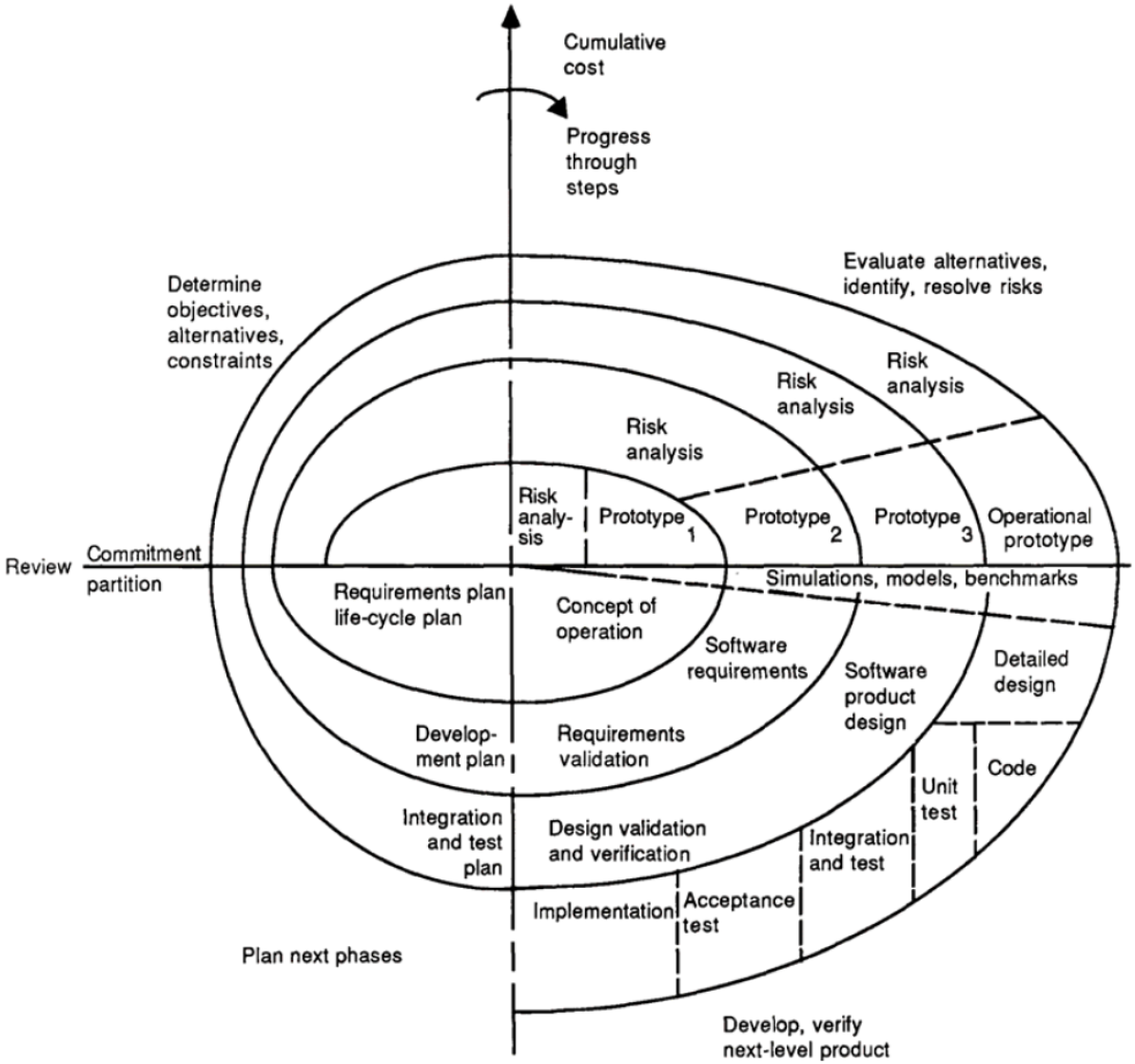
Iterative Design



Interactive Design (cont'd)

- Each cycle is one iteration
- Release is produced at the end of each iteration
- Customer's feedback and evaluations can be incorporated into next release
- Problems
  - It's expensive to use customer's time to test
  - Customers may not be available
  - Customers don't like → they don't buy

Spiral Model



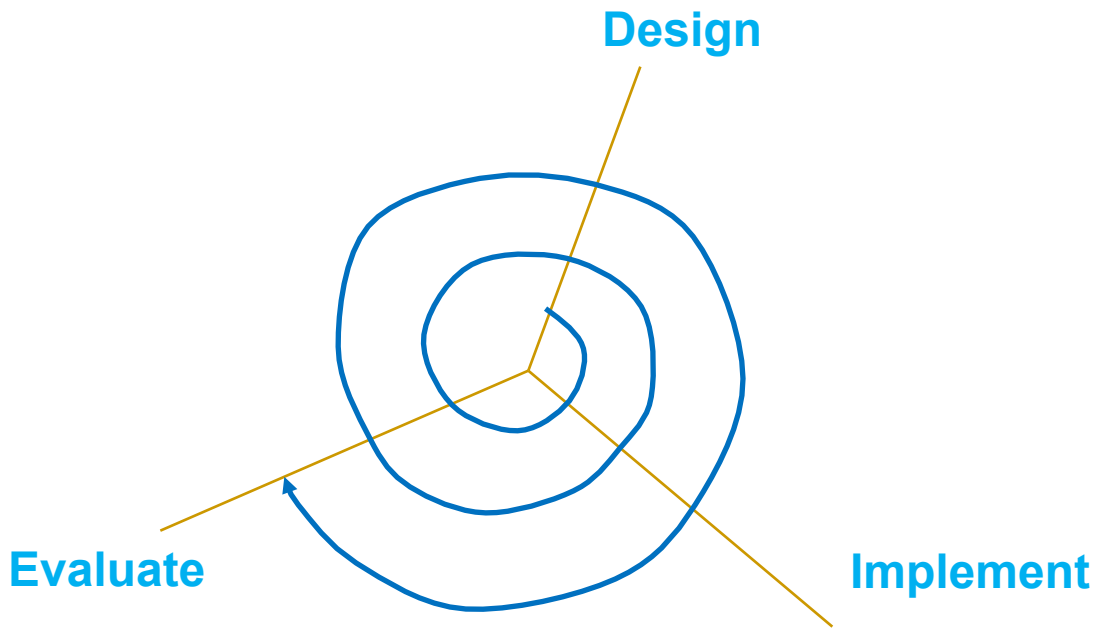
(Boehm 1988)

Spiral Model (cont'd)

- Process is represented as a spiral rather than as a sequence of activities with backtracking
- Each loop in the spiral represents a phase in the process
- No fixed phases such as specification or design - loops in the spiral are chosen depending on what is required
- Risks are explicitly assessed and resolved throughout the process

Spiral Model for UI Design

- An improvement of iterative design



Spiral Model for UI Design (cont'd)

- Early cycles use cheap prototypes
  - Paper prototypes
  - Sketches on computer
  - Quick prototyping tools
- Providing multiple prototype alternatives
  - Parallel prototyping
- Later cycles should be better than early ones
- Only mature releases of later cycles can be distributed to users

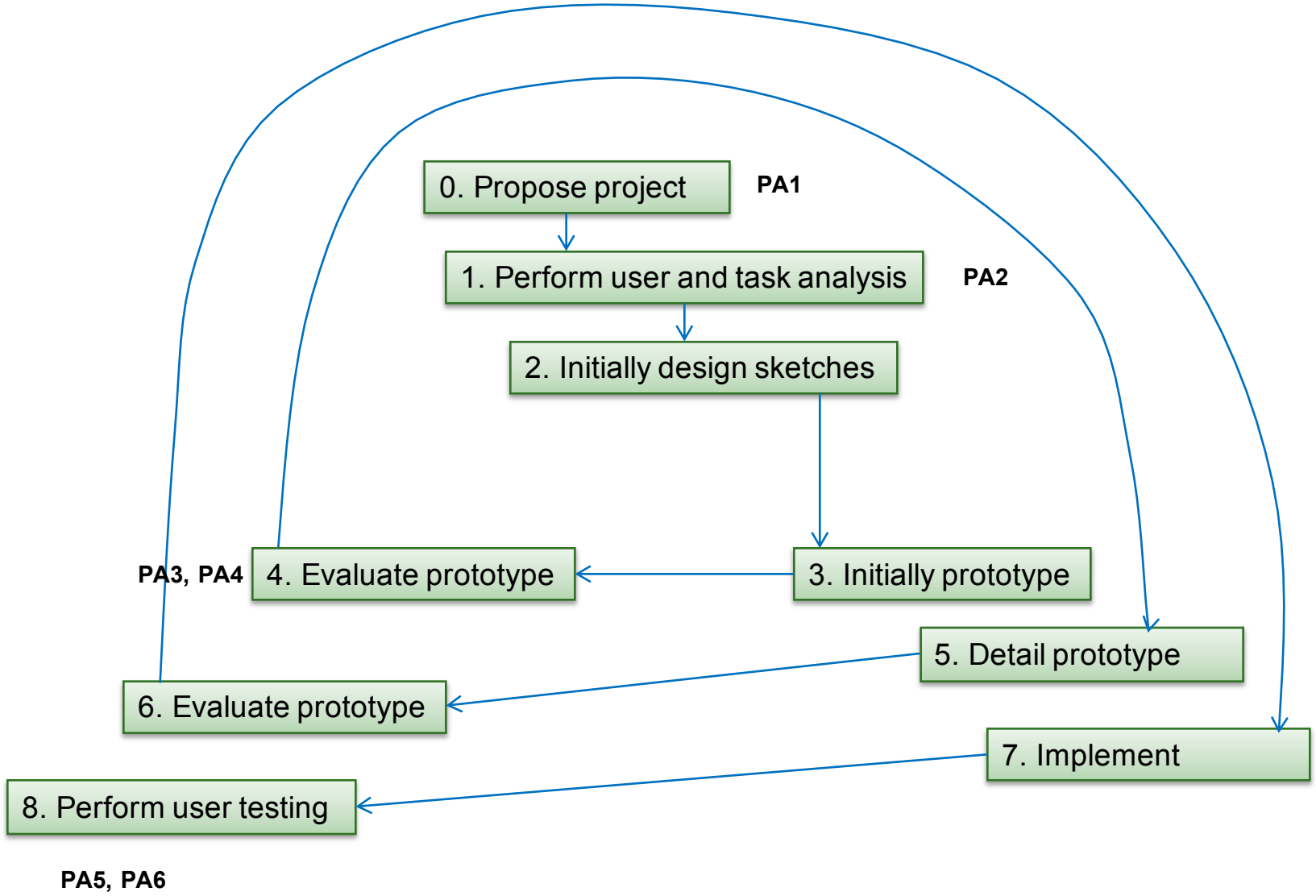
User-Centered Design

- Also known as Participatory Design
- A type of iterative design with Spiral
- Focusing on users and tasks
  - User analysis: who uses the system
  - Task analysis: what users need to do
- Getting users involved in the process
  - Users as evaluators, consultants and designers (sometimes)
- Constant evaluation
  - Users evaluate prototypes and releases

User-Centered Design (cont'd)

- Advantages
  - Accurate information and useful suggestions
  - Opportunity to argue over design decisions
  - Increased ego involvement in system success
- Potential problems
  - Users are not always available to participate
  - Their time maybe expensive
  - Users are not UI designers
  - Users have strong ego and preferences
  - UI designers overly obey users' preferences

Process for Projects in This Class



Applying User-centered Design

- You are all potential users of proposed apps
- Users help identify problems
  - Members of other groups review a group's proposal
  - Collect feedback from potential users
  - Observer existing users' actions
- Users review and provide feedback
  - In each milestones, members of other groups provide feedback on design of a group
- User evaluation
  - By the end of the project: everyone will review the design of another group

How to be successful in teamwork?

- Define clear goals and expectations
- Assign clear responsibilities and tasks for everyone
- Talk about accountability
  - Who is responsible when things go wrong
- Meet weekly to review status, even if no assignment is due that week
  - Record meeting minutes
- Work early than late
- Understand your teammates
  - Motivation, commitment, capability

"I haven't read it yet, but I've downloaded it from the Internet."

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Principles

- Determine users' skill levels
  - Novice/first-time users
  - Knowledgeable intermittent users
  - Experts and frequent users
- Identify the tasks
  - Frequent actions
  - Less frequent actions
  - Infrequent actions
- Choose appropriate interaction styles
  - Direct manipulation
  - Menu selection
  - Form fillin
  - Command language
  - Natural language

Principles

- Use Shneiderman's eight golden rules of interface design
  - To be discussed in the next slide
- Prevent errors
  - Constructive and informative error messages
  - Organizing screens and menus functionally
  - Providing feedback about the state of the interface
  - Correct actions
    - E.g., grayed menu items
  - Complete sequences
    - E.g., wizard windows often have both Next and Finish buttons
- Increase automation while preserving human control
  - Auto suggestion
  - Auto completion
  - Allowing users to change

Shneiderman's Eight Golden Rules

- Strive for consistency
- Cater to universal usability
- Offer informative feedback
- Design dialogs to yield closure
- Prevent errors, rapid recovery
- Permit easy reversal of actions
- Support user control
- Reduce memory load

Summary

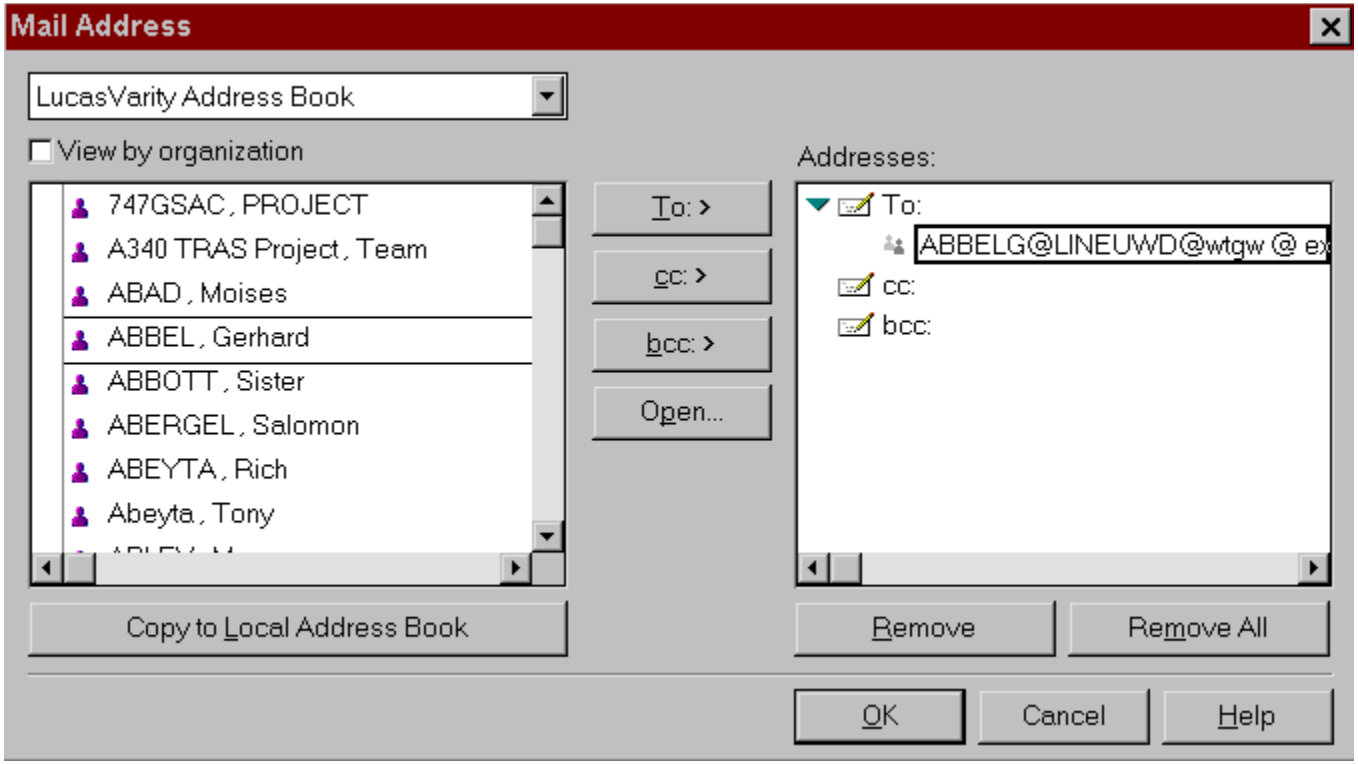
- User-centered design is a preferable process in UI design
- Groups in this class follow this process
- UI design principles and rules
  - Discussed across the lectures including this one

Let Your Ideas Flow

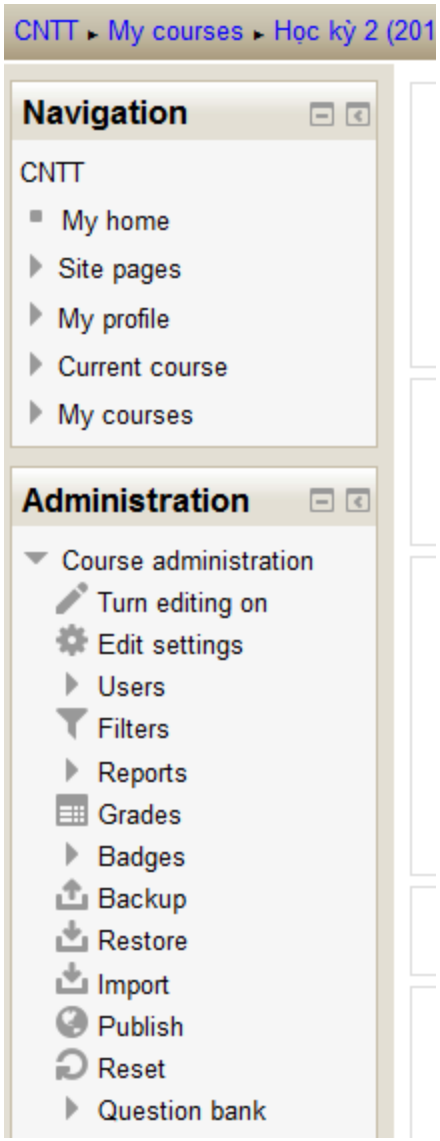
- Chindogu, Japan

UI Hall of Fame or Shame

UI Hall of Fame or Shame



Moodle



Problems with the order of items?

Problems with icons?

ỦY BAN NHÂN DÂN HUYỆN VŨ THƯ
MỖI GIA ĐÌNH HAI CON VỢ
CHỒNG HẠNH PHÚC
DÂN SỐ - KẾ HOẠCH HÓA GIA ĐÌNH

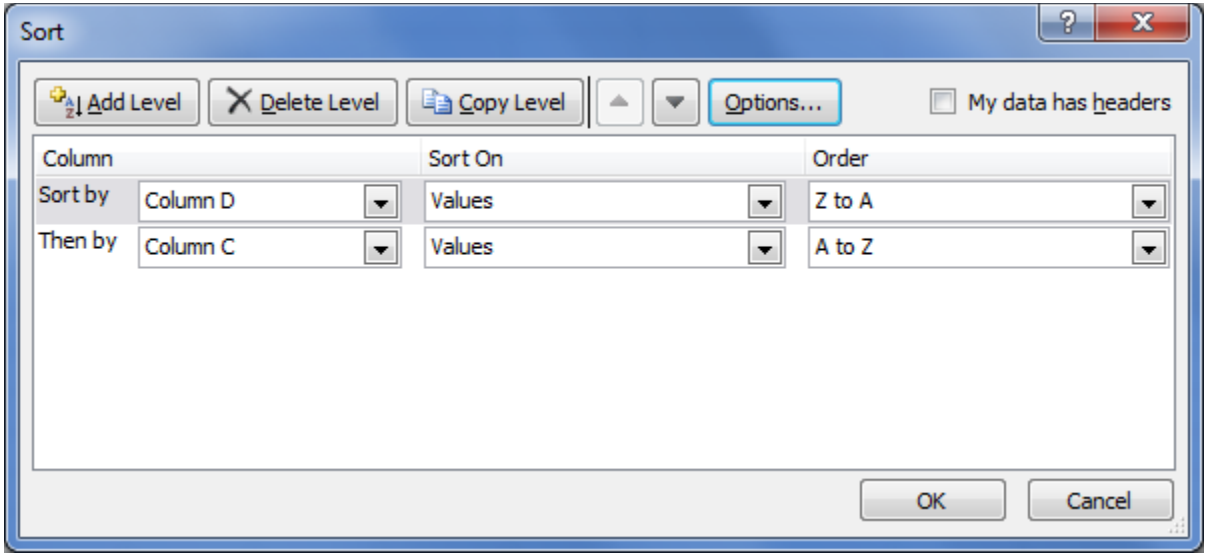
- Lê Minh Quân

CÁC ĐỐI TƯỢNG KHÔNG ĐƯỢC PHÉP LƯU THÔNG QUA HẦM THỦ THIÊM
- NGƯỜI ĐI BỘ, XE THÔ SƠ, XE 3-4 BÁNH TỰ CHẾ
- XE VẬN CHUYỂN HÀNG ĐỘC HẠI, NGUY HIỂM, CHẤT DỄ CHÁY, CHẤT NỔ
- XE VẬN CHUYỂN SÚC VẬT SỐNG KHÔNG ĐẢM BẢO AN TOÀN VỆ SINH MÔI TRƯỜNG
- XE CÓ TỔNG TẢI TRỌNG ⩾30 TẤN
- XE KÉO RƠ MOÓC HOẶC SƠ MI RƠ MOÓC, XE BÁNH XÍCH
- XE Ô TÔ KỂ CẢ HÀNG HÓA CÓ CHIỀU CAO > 4,2M HOẶC CÓ CHIỀU NGANG > 2,5M

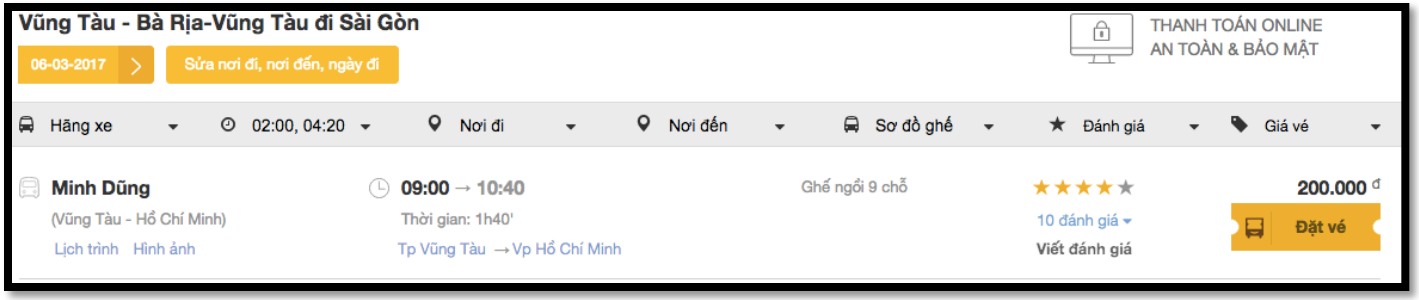
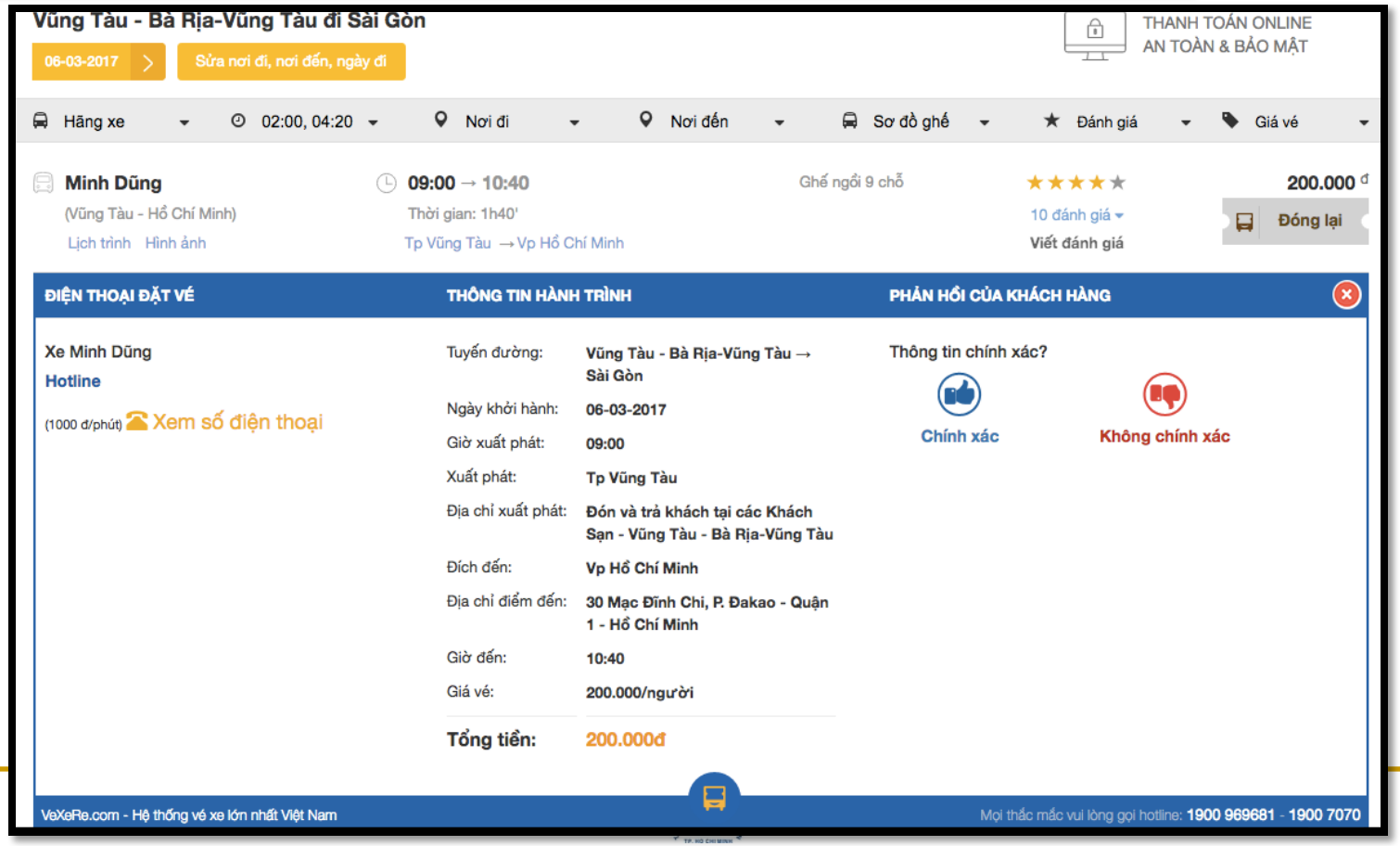
BKAV

- Lê Thành Quang

Sort dialog in Excel



Vexere.com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