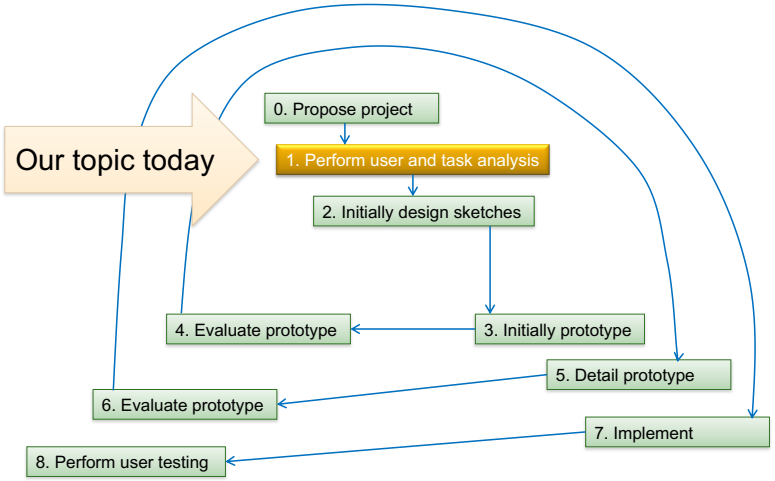
Task Analysis

Process for Projects in This Class



Outline

- User analysis
- Task analysis
- Domain analysis
- Requirements document
- UI Hall of Fame or Shame

User analysis

- The process of identifying and describing the users who use the system
- Characteristics of target users
  - Age, gender, culture, language
  - Computer experience
  - Domain experience, application experience
  - Usage frequency
  - Physical limitations
  - Education
  - Motivation
  - Work environment
  - User relationships
  - User social status (e.g., role, position)
  - Etc.

Image: growthpixel.com

User analysis (cont'd)

- Description of target users
  - General information
  - User characteristics (discussed above)
  - User environment
    - Where the tasks will be performed?
  - Major goals of the job
    - What is the end result?
  - User roles (e.g., buyer, seller)
    - if any
  - User preferences
  - Relationships among users
    - if any

Images: openclipart.org

User analysis (cont'd)

- Example system: HaiLua.com.vn
  - A web-based application for users to sell and buy farming products
  - Key features
    - Post products to sell (by famers and others)
    - Search for products
    - Buy products
    - Compare products' prices and other characteristics
    - Rate sellers and buyers
    - Provide comments or feedback on products or transactions

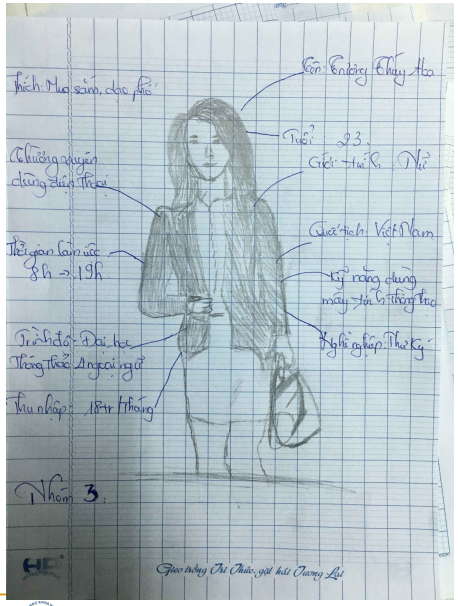
- User analysis
  - By role
    - Buyers/customers
    - Sellers (farmers and traders)
    - Administrator
  - By language/culture
    - Focusing on Vietnam farming products from Vietnamese farmers

User analysis (cont'd)

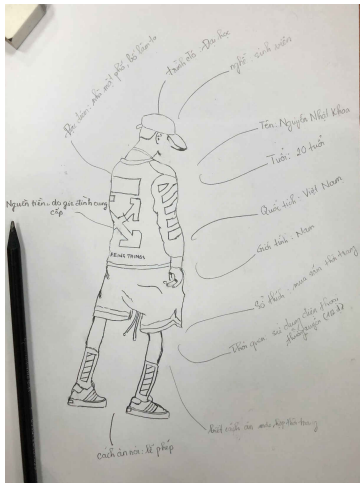
- Techniques to do user analysis
  - Recording
  - Interviews
  - Questionnaires
  - Observation
  - Combination of the above

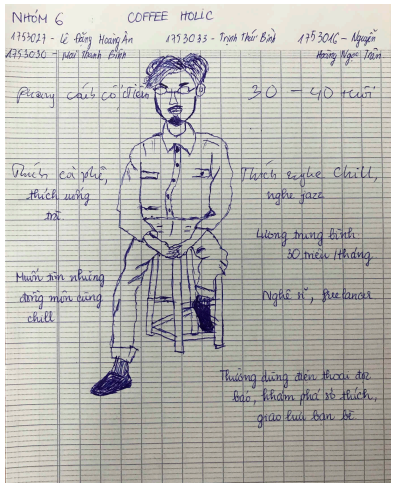
- Obstacles/challenges
  - Designers and users are sometimes isolated
  - Users may be overlooked by designers
    - Designers may make wrong assumptions about users
  - It's expensive and difficult to talk to some users
    - E.g., high-ranking people, doctors, executives

An example of User Persona



Personas





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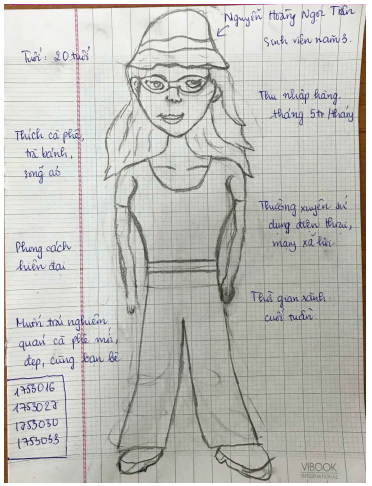

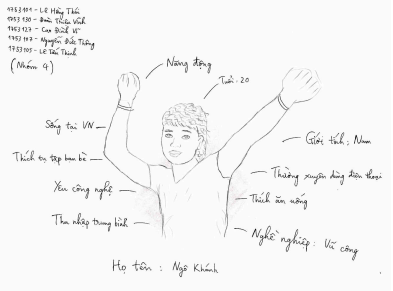

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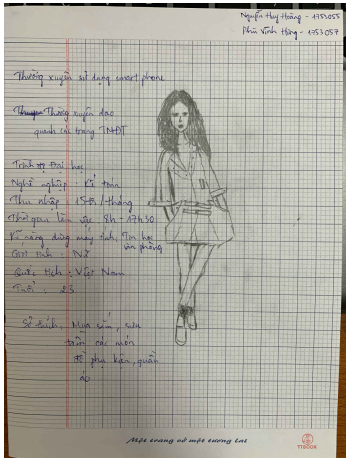
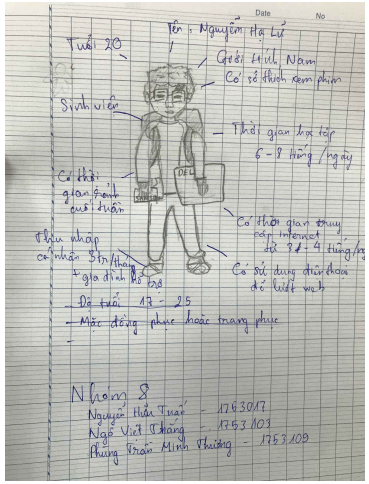
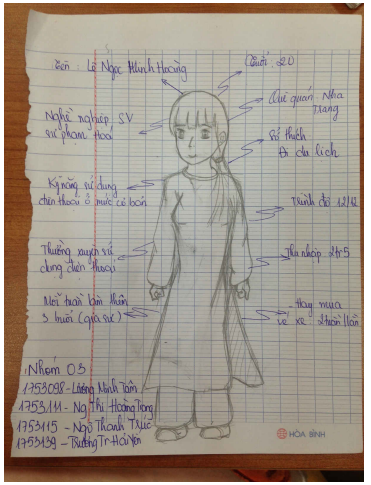
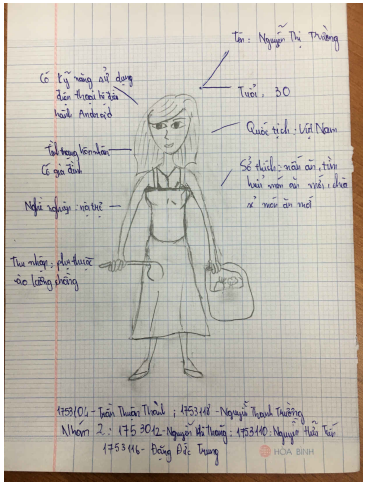


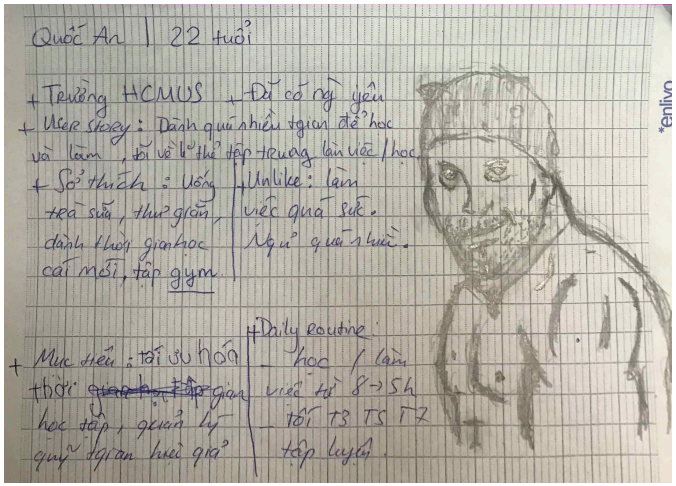


Personas





Persona



Task analysis

- The process of analyzing and documenting the tasks that the system may provide to users
  - What needs to be done (goal)
  - What conditions to do the task (precondition)
  - What steps to be taken (subtasks)
- Each task is often a goal to achieve by users
- Task analysis is an early step in UI design that provides basis for
  - UI designing
  - UI evaluation and improvement
  - User documentation

Task analysis procedure

- Two main steps

1. Model tasks
   - Gathering information
   - Describing tasks into requirements

2. Evaluate and refine
   - Review and update requirements

Model tasks

- Create a list of all tasks to be performed by users
- Rank the tasks by frequency of use and importance
- Gather other detailed information about each task
- Model the relationships (e.g., using use-case model)
  - between tasks and users
  - among tasks
- Present/describe tasks in forms of documents, diagram, etc.

Techniques to do task analysis

- Techniques to gather in formation (same as doing user analysis)
  - Data recording
  - Interviews
  - Questionnaires
  - Observation
  - Combination of the above
- Technique to analyze
  - Task decomposition

Data recording

- Documents, manuals, instructions
- Notes, audio, photographs
- Notes + photographs
- Audio + photographs
- Video

Interviews

- Structured
  - tightly scripted, often like a questionnaire
  - replicable but may lack richness
- Unstructured
  - not directed by a script
  - rich but not replicable
- Semi-structured
  - guided by a script but interesting issues can be explored in more depth
  - can provide a good balance between richness and replicability

Questionnaires

- Paper, email and the web used for dissemination
- Questions can be closed or open
  - closed questions are easier to analyze, and may be done by computer
- Can be administered to large populations
- Sampling can be a problem when the size of a population is unknown
  - common online
- Tool
  - https://surbee.io

Online questionnaires

- Advantages
  - Responses are usually received quickly
  - Data can be collected directly into database for analysis
  - Time required for data analysis is reduced
  - Errors can be corrected easily
  - Many online survey tools available
    - E.g., survey monkey
- Problems
  - Sampling is problematic if population size is unknown
  - Preventing individuals from responding more than once
  - Delayed response

Observation

- Direct observation
  - in the field or in controlled environments
  - Structuring frameworks
  - ***Think-aloud*** protocol
    - Person talks about what they are doing, while they are doing it (or just before or after)
    - Observer can ask probe questions
  - Probe questions affect performance, as does thinking aloud
- Indirect observation
  - tracking users' activities
    - Physical location/movement
    - Interaction logging, timers

Task decomposition

- Aims
  - describe the actions people do
  - describe order of subtasks
  - structure them within task subtask hierarchy
- Hierarchical Task Analysis (HTA)
  - introduced by Annett and Duncan (1967) to evaluate an organization's training needs
  - very useful for analyzing and representing the behavioral aspects of complex tasks
  - now widely used in interface design

Hierarchical Task Analysis (HTA)

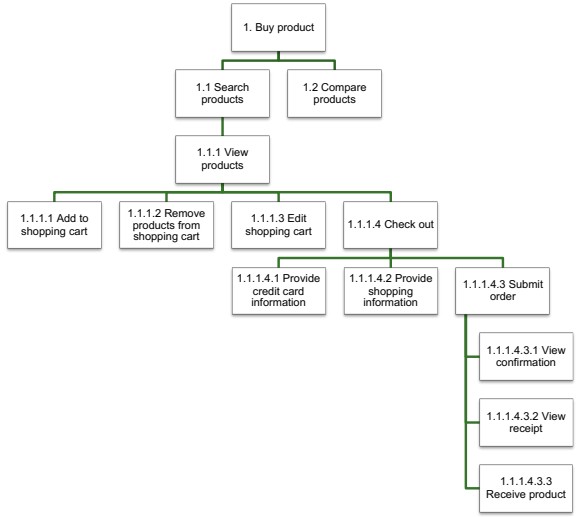
- Breaks tasks into subtasks and operations or actions
  - These components are represented using a structure chart
- Includes
  - identifying and categorizing tasks
  - identifying the subtasks
  - checking the overall accuracy of the model
- Useful for UI design
  - Enabling designers to envision the goals, tasks, subtasks, operations, and plan essential to users' activities

Generating the Hierarchy

1. Start from overall goal, e.g. clean the house
2. Get list of tasks
3. Break down into numbered sub-tasks
   - Group tasks into higher level tasks
   - Decompose lowest level tasks further
4. Describe each sub-task

   - How do we know when to stop?
     - Is “empty the dust bag” simple enough?

HTA for HaiLua.com.vn



Task analysis procedure

- Two main steps
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Evaluate and refine requirements

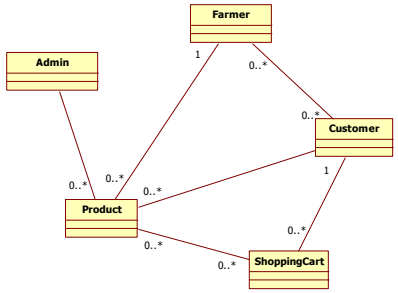
- Evaluate, simplify and fix issues in the task description
- Evaluation techniques
  - Walk-through
  - Formal review/inspection
  - Offline review
  - Online review

Domain analysis

- The process identifying data models for the system domain
  - People and things
  - How they are related
- Outputs
  - Object or class models (e.g., using UML diagram)
  - Data models (Entity Relationship models)

Domain analysis (cont'd)

- HaiLua.com.vn's class model (high-level)



Requirements document

- User analysis
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    - User environment
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    - User roles (e.g., buyer, seller)
      - if any
    - User preferences
    - Relationships among users
      - if any

Requirements document (cont'd)

- Task analysis, for each task
  - **Goal, precondition, subtasks**
  - Where the task is performed
    - On Internet, desktop, mobile
    - At a kiosk, a workstation
  - How often is the task performed?
    - every hour, every day
    - once a day, once a month
  - What are resource constraints
    - One second, one minute, or not constrained
  - How the task is learned?
    - Training, install-and-use, by trying, by watching others
  - Task exceptions
    - What are exceptions for the task and how exceptions are handled
  - Who else are involved in the task

Requirements document (cont'd)

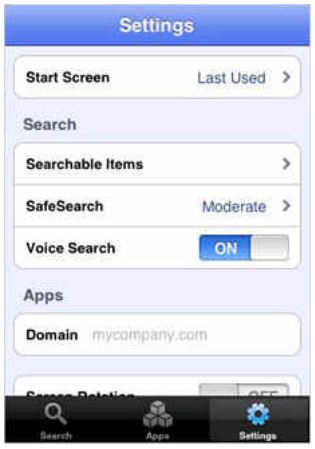
- User and Task analysis
  - Use-case model
- Domain analysis
  - Object model
  - ER model

Team work

- Teams in this exercise are the same as those of your projects
- Two team members who are BA go to another team to interview everyone on the team
  - Record and summarize user characteristics and tasks
- Time
  - Interview: 20 minutes
  - Report: 10 minutes (5 minutes x 2 teams)

Over-design UI

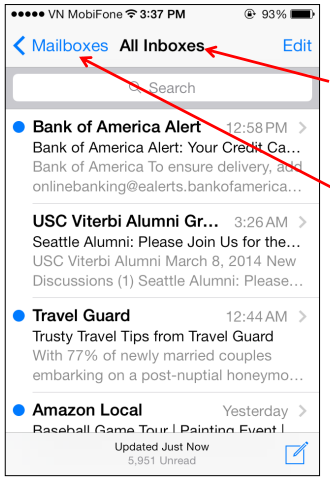
Over-design

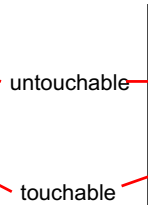


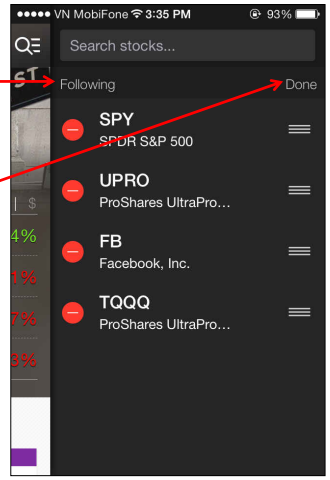
Good design

Source: http://mobile.smashingmagazine.com/2009/07/21/iphone-apps-design-mistakes-overblown-visuals/

iPhone Mail vs. Yahoo Finance



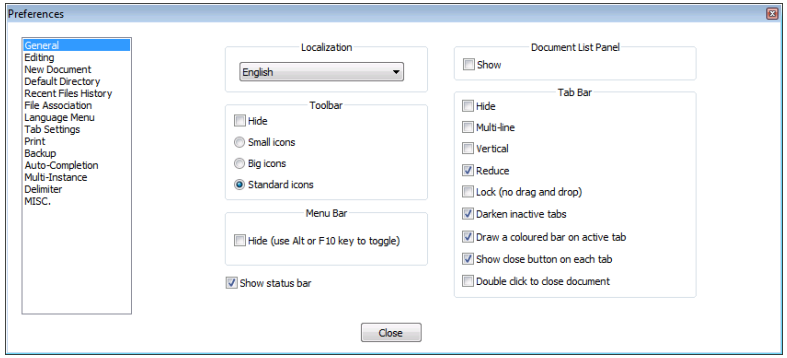




Consistent design

Inconsistent design

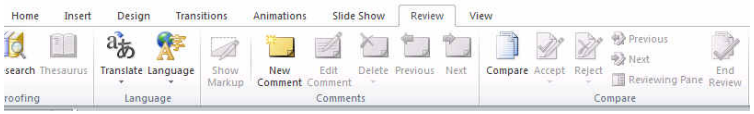
Notepad++ (Preferences Dialog)



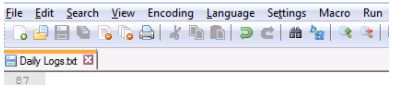
Inconsistent grouping: two top groups have only one item each.
"Show status bar" does not belong to any group

MS PowerPoint vs. Notepad++

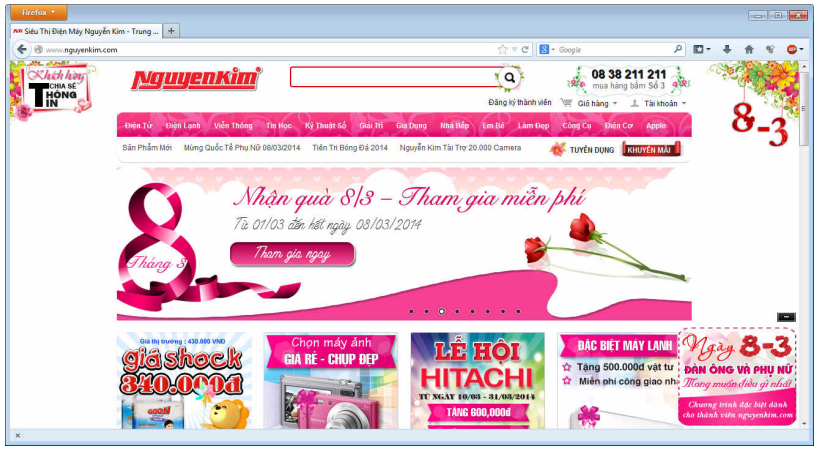
- Toolbar buttons are large and with labels



- Toolbar buttons are small and without labels



Nguyenkim.com on 8/3



chinhphu.vn

Videos

- MS Office Future Version 2019
  - http://www.youtube.com/watch?v=a6cNdhOKwi0
- Others
  - http://www.dump.com/2011/02/12/a-day-made-of-glass-cornings-vision-for-the-future-with-specialty-glass-at-the-heart-of-it-video/
  - Starfire
    - http://www.youtube.com/watch?v=NKJNxgZyVo0