Prototyping and HTA (Hierarchical Task Analysis)

EGR 223 – SE Approach to HCI

Prototyping overview

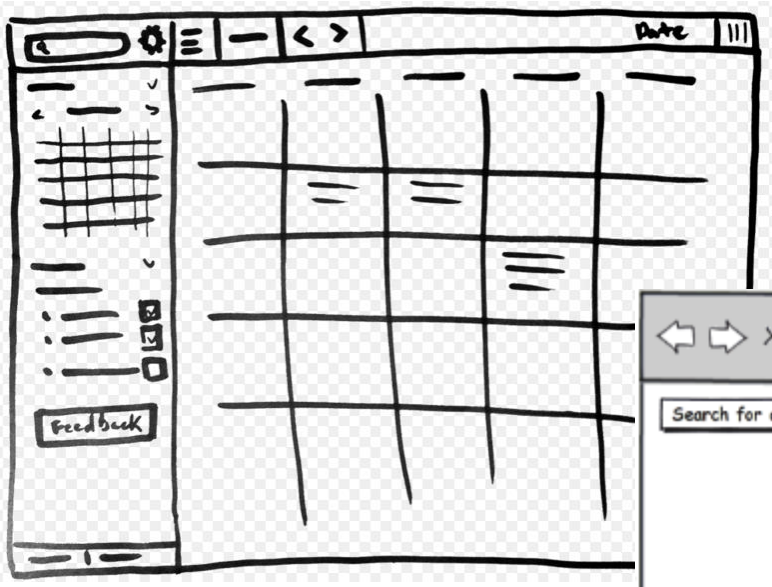
- Prototype definition
  - a first or early example that is used as a model for what comes later (Webster)
- Two key kinds of software prototyping
  - Evolutionary – An incremental approach that implements limited functionality at first and is continually expanded and eventually becomes the working program
  - Throw away – The prototype serves a specific purpose and is disposed of once that purpose has been fulfilled
- Our focus is on throw away GUI prototyping
  - Used to visualize requirements
  - Used as a means to get feedback on user experience

Levels of prototyping

- Rough
  - Paper and pencil
  - White board
- Low fidelity
  - Use tools to create, but typically just wire frame
  - No emphasis on color, fonts or images
  - Emphasize function not form
  - May or may not allow navigation
- High fidelity
  - Use real-life controls
  - Use intended colors, fonts, and images
  - Includes navigation abilities

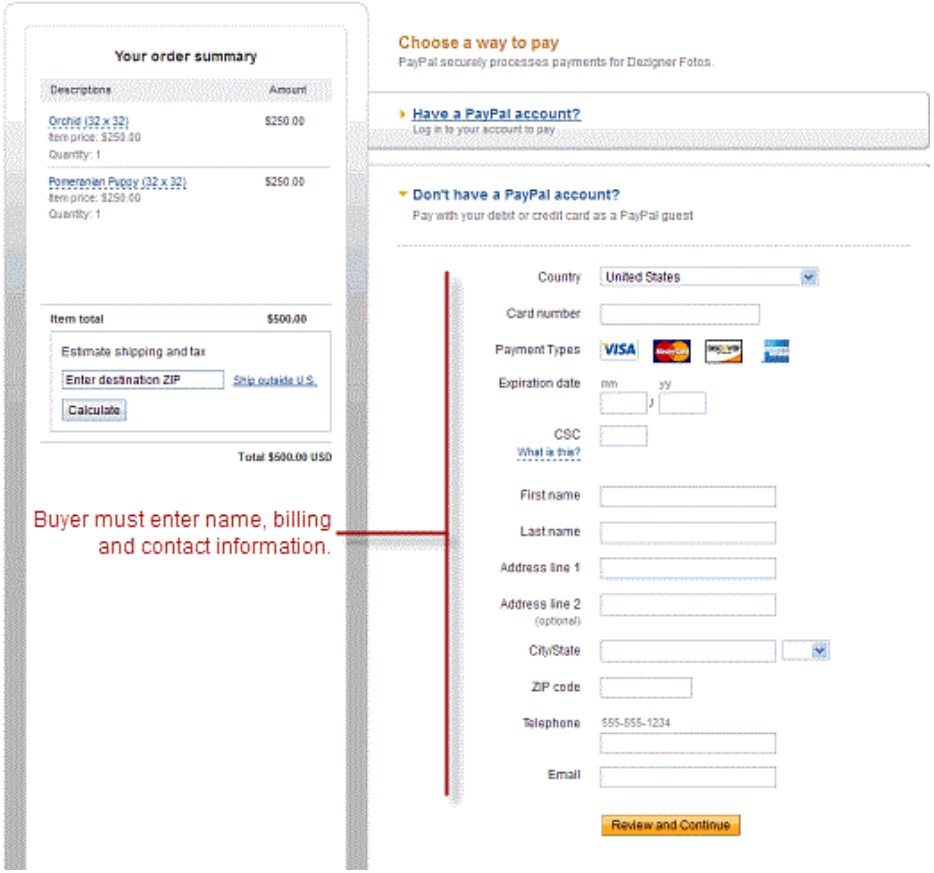
Rough/Low Fidelity Example

A quick sketch to show the main functionalities

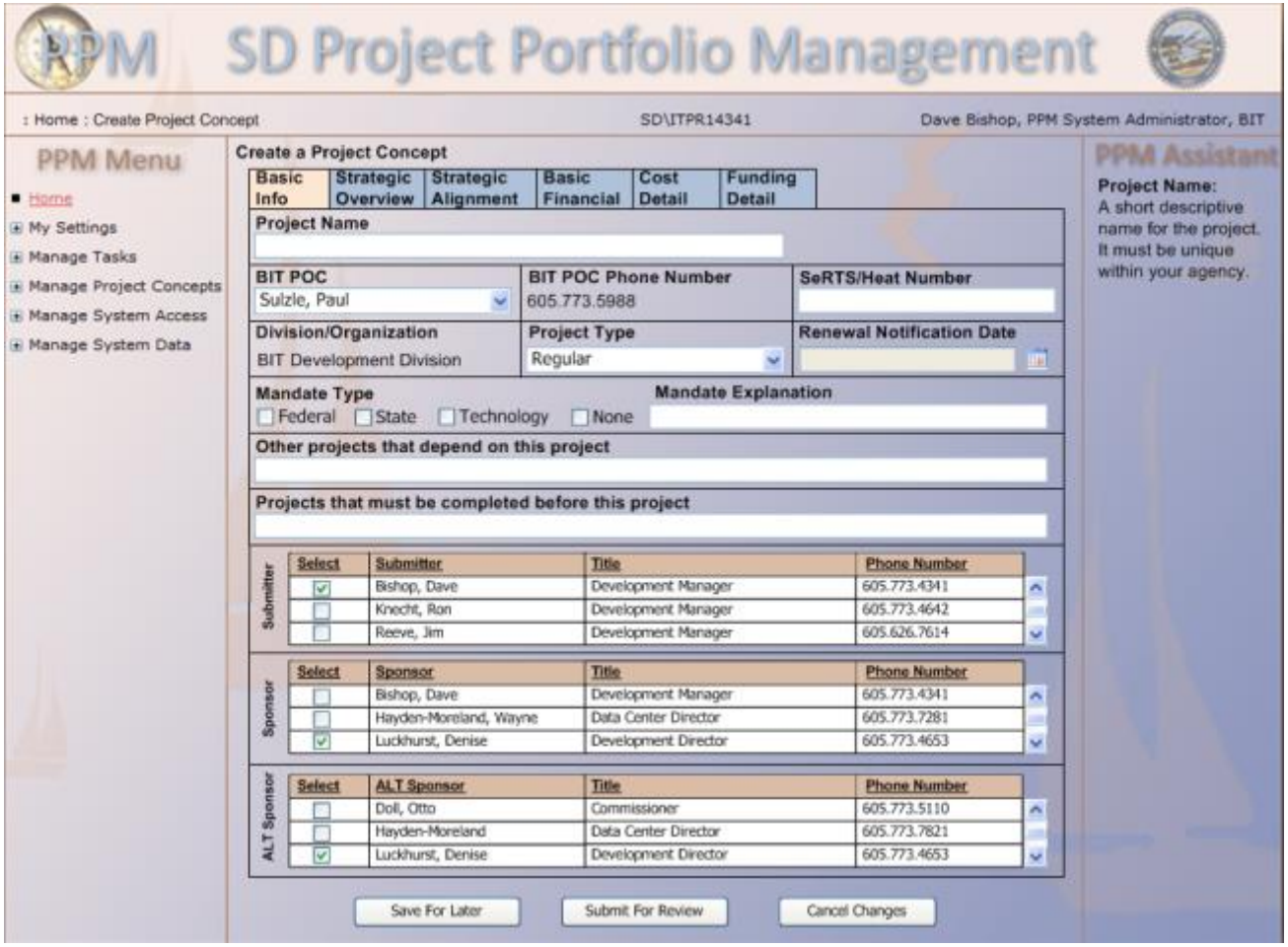


Medium Fidelity Example

Realistic representation of the product. Final result should look very closely to this. Static pages in HTML/CSS for website mockups.



High Fidelity Example



Scope decisions

- Narrow scope – only those pieces of the system that are critical to the success
- Intermediate scope – those parts of the system considered high risk, requirements are unclear, or where different options need to be evaluated
- Broad scope – the whole system

Pros/cons of prototype

Advantages

- Makes the abstract tangible
- Speed
- Makes design problems visible
- Testable with users
- Allows multiple designs to be explored simultaneously at low cost

Disadvantages

- Clients may think project is almost done
- Developers get attached to their work
- Prototype exceeds developers abilities
- Prototype takes on a life of its own

Prototyping in HCI

- We will use prototyping as a means to evaluate proposed UI designs

- Evaluation can occur at multiple levels
  - We as designers can evaluate our designs by prototyping them
    - As we visualize our concepts we can iteratively update our design
  - We can have team members evaluate our design via prototypes
  - We can have users evaluate our designs

Prototype Design

- First we must define the goal of the proposed system
  - Who is the target audience
  - What is their overarching goal
  - What problem(s) are they trying to solve
- One way to problem solve is divide and conquer
  - Start at a high level of abstraction
  - Decompose the problem into tasks
  - Design a system that will help the target audience achieve their goal on a task by task basis
- The Hierarchical Task Analysis (HTA) approach is a useful tool for decomposition

Steps for HTA

1. Start with the high-level abstraction
2. Decompose each task into sub-tasks
3. Repeat 1 and 2 until no further tasks/sub-tasks identifiable
4. Cluster or group related tasks and label the group
5. Identify dependencies between groups
6. Identify dependencies within groups
7. Repeat steps 1-6 until all groups, tasks and subtasks have been identified and optimized
8. Create a diagram that visualizes the dependencies both between groups and the tasks within each group

Example using HTA – part 1

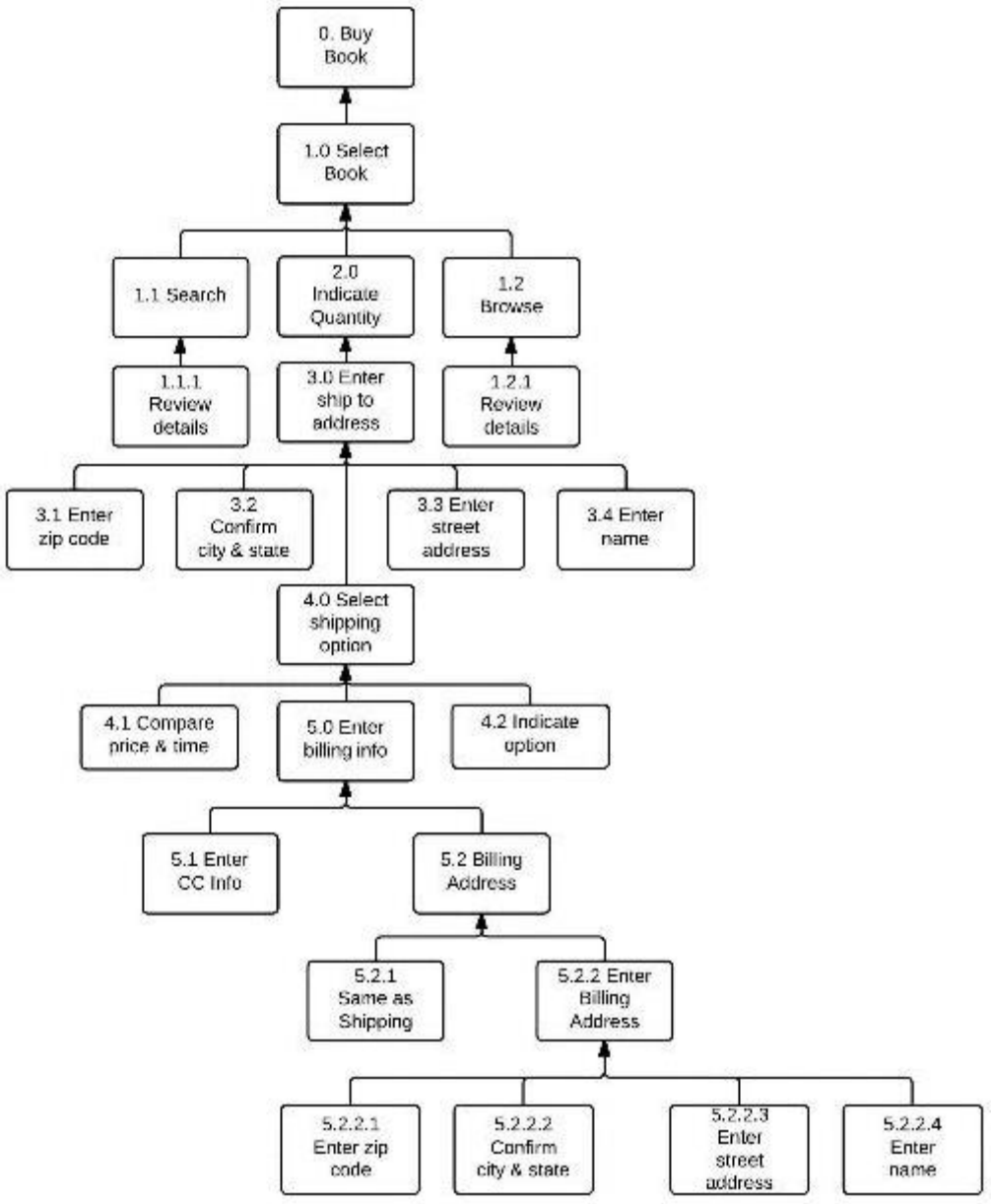
- Goal: Buy a book online
- Initial Task List
  - Select book to purchase
  - Indicate quantity
  - Enter ship to address
  - Select shipping options
  - Enter billing information
  - Confirm order

Example using HTA – part II

- Decomposed Task List
  - Select book to purchase
    - Search for book
      - Browse by category
      - Enter author, title or ISBN
    - Review details, pricing and availability
  - Indicate quantity
  - Enter ship to address
    - Specify name
    - Specify street address
    - Specify city, state and zip
  - Select shipping options
    - Compare pricing and delivery times
    - Select desired option
  - Enter billing information
    - Enter credit card info
    - Choose same as ship to or enter alternative address
  - Confirm order

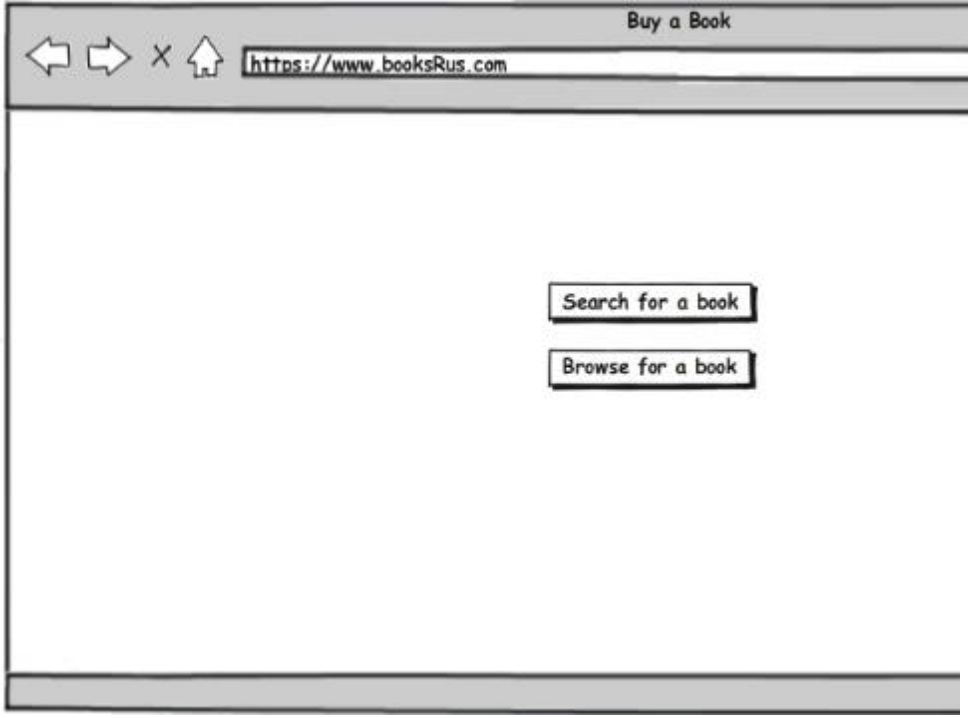
Example using HTA – part III

- Convert to HTA Diagram



Example Prototype

- Use the HTA to drive development of a prototype
- Buy Book Prototype in next few slides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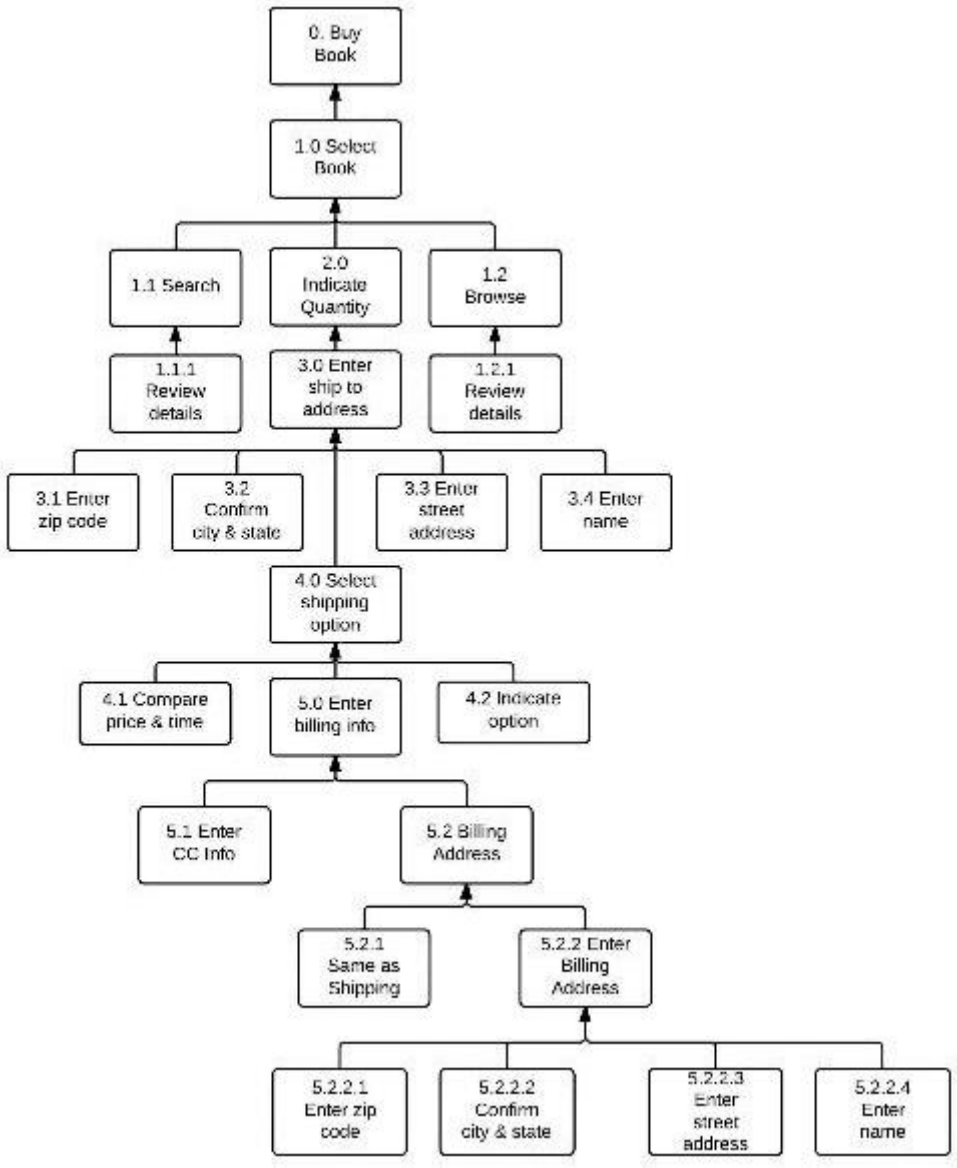

0. Buy Book
1.0 Select Book
1.1 Search
2.0 Indicate Quantity
1.2 Browse
1.1.1 Review details
3.0 Enter ship to address
1.2.1 Review details
3.1 Enter zip code
3.2 Confirm city & state
3.3 Enter street address
3.4 Enter name
4.0 Select shipping option
4.1 Compare price & time
5.0 Enter billing info
4.2 Indicate option
5.1 Enter CC Info
5.2 Billing Address
5.2.1 Same as Shipping
5.2.2 Enter Billing Address
5.2.2.1 Enter zip code
5.2.2.2 Confirm city & state
5.2.2.3 Enter street address
5.2.2.4 Enter name

Buy a Book

https://www.booksRus.com

Search for a book

Search for a Book

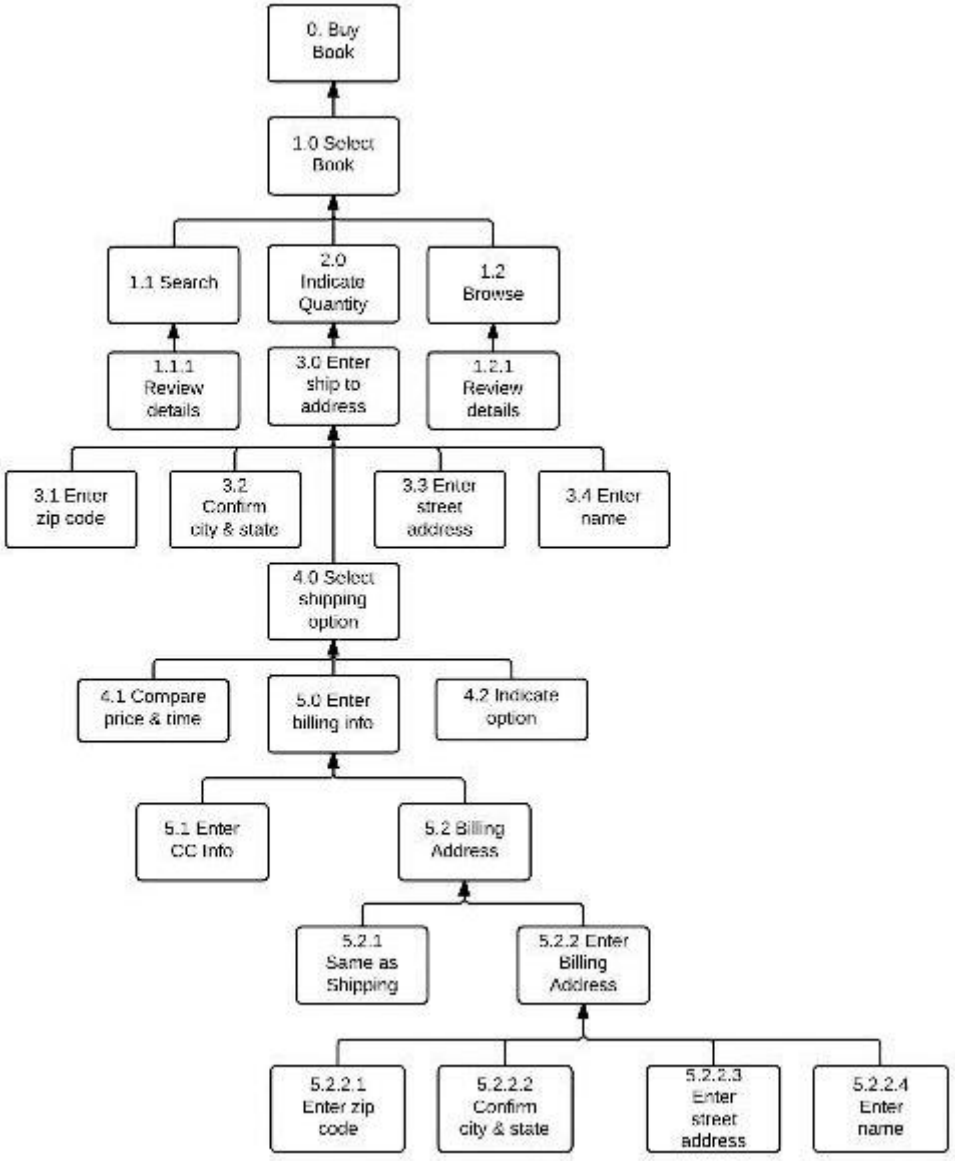
Browse for a book

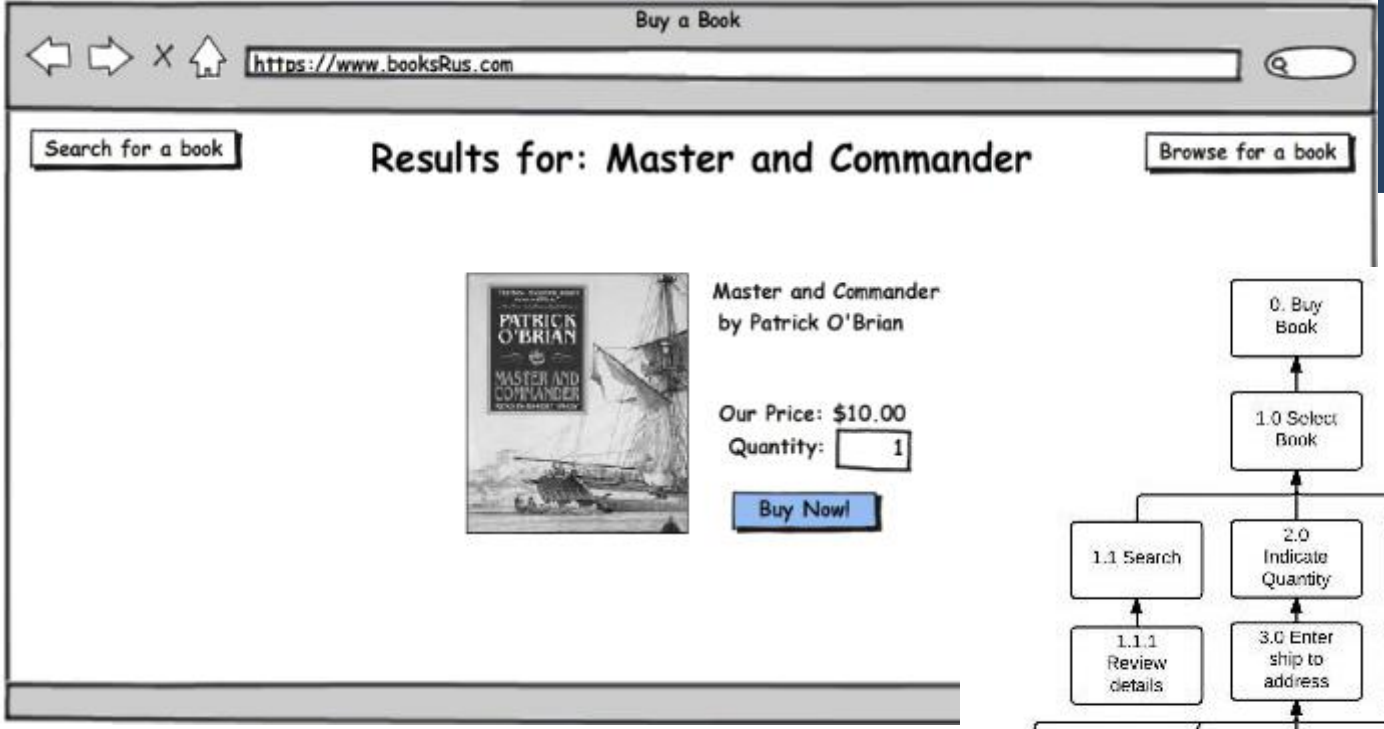
Title: Master and Commander

Author:

ISBN:

Clear fields | Search

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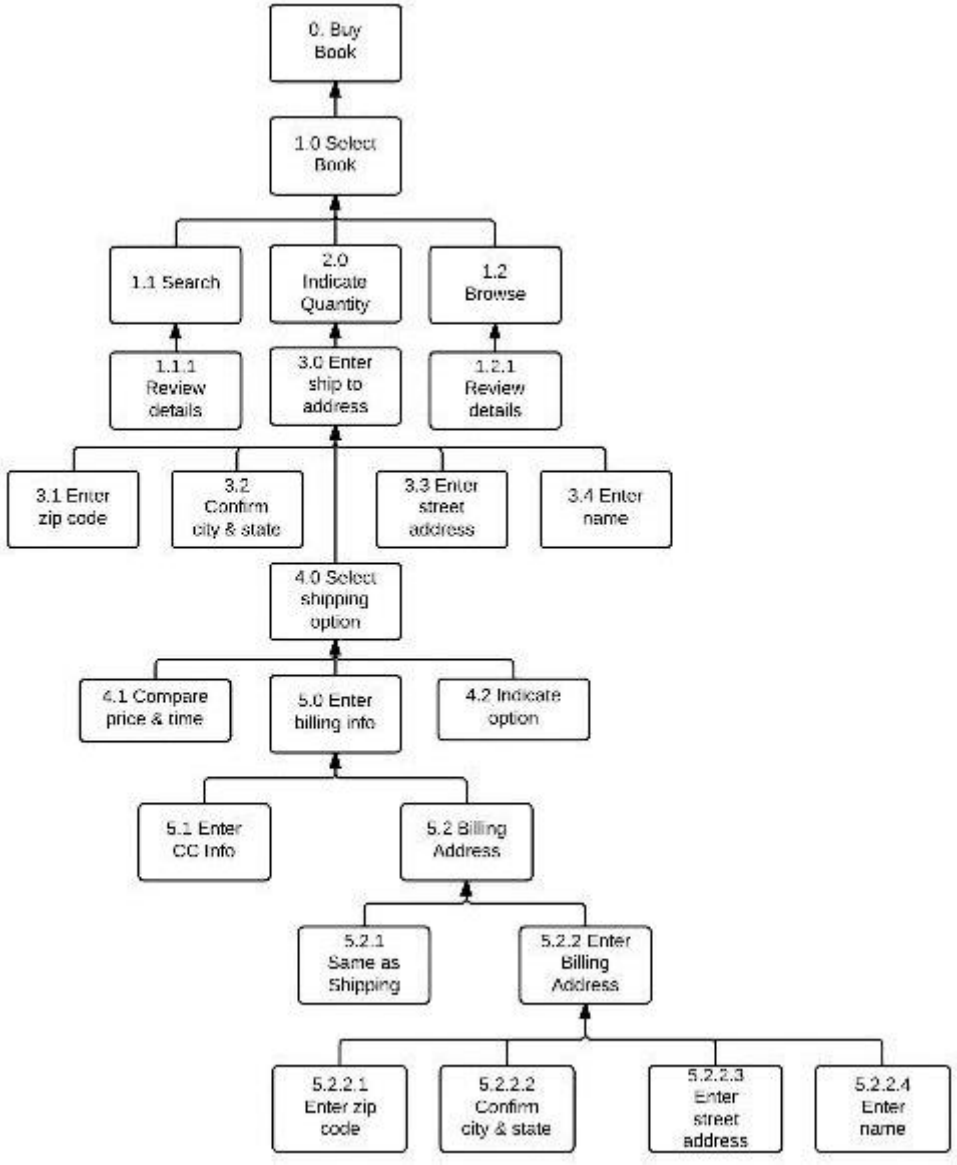
0. Buy Book
1.0 Select Book
1.1 Search
2.0 Indicate Quantity
1.2 Browse
1.1.1 Review details
3.0 Enter ship to address
1.2.1 Review details
3.1 Enter zip code
3.2 Confirm city & state
3.3 Enter street address
3.4 Enter name
4.0 Select shipping option
4.1 Compare price & time
5.0 Enter billing info
4.2 Indicate option
5.1 Enter CC Info
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5.2.1 Same as Shipping
5.2.2 Enter Billing Address
5.2.2.1 Enter zip code
5.2.2.2 Confirm city & state
5.2.2.3 Enter street address
5.2.2.4 Enter name


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Shipping Info
Browse for a book
First name:
Dave
Last name:
Bishop
Zip code:
92509
City:
Jurrupa Valley
State:
CA
Address:
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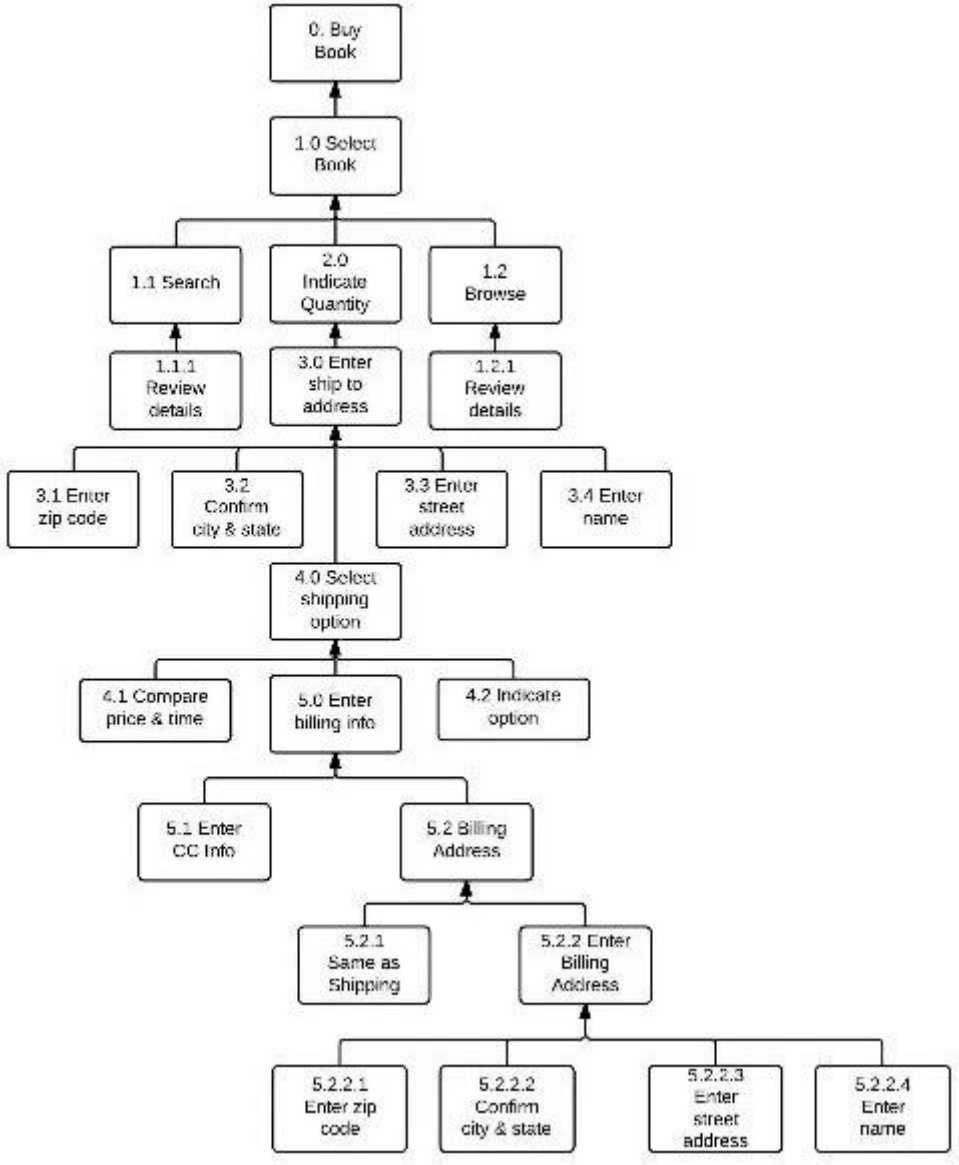
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Credit Card #:
4433-1234-3459-6389
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2014
Billing address same as shipping:
Yes
No
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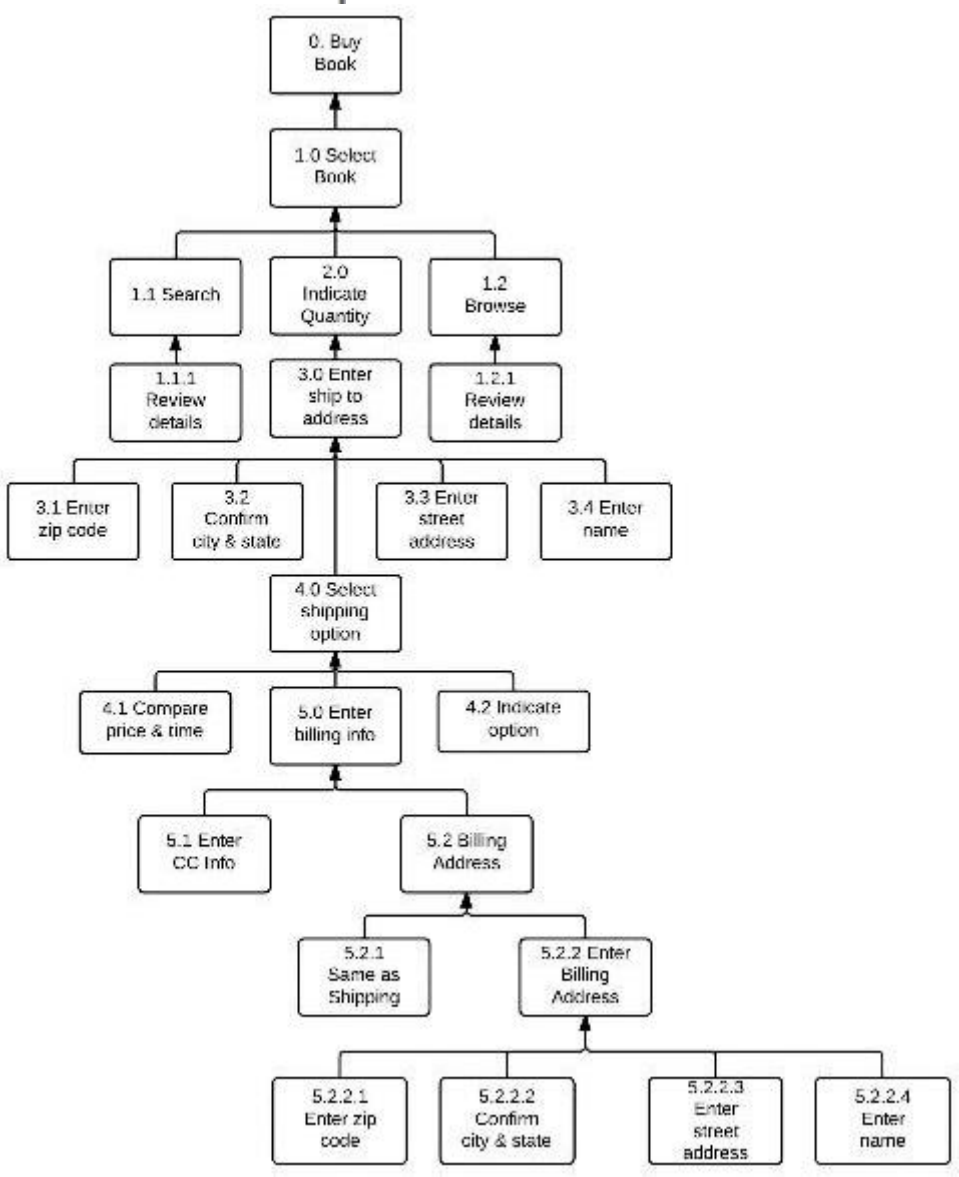
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5.2.2.1 Enter zip code
5.2.2.2 Confirm city & state
5.2.2.3 Enter street address
5.2.2.4 Enter name

Buy a Book

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Search for a book

Browse for a book

Buy Master and Commander
Place Order

Quantity: 1

Order Total: $10.00

Ship To: Dave Bishop 5720 Falling Le

Billing same as Shipping: Yes

Credit Card Info: American Express ****-638

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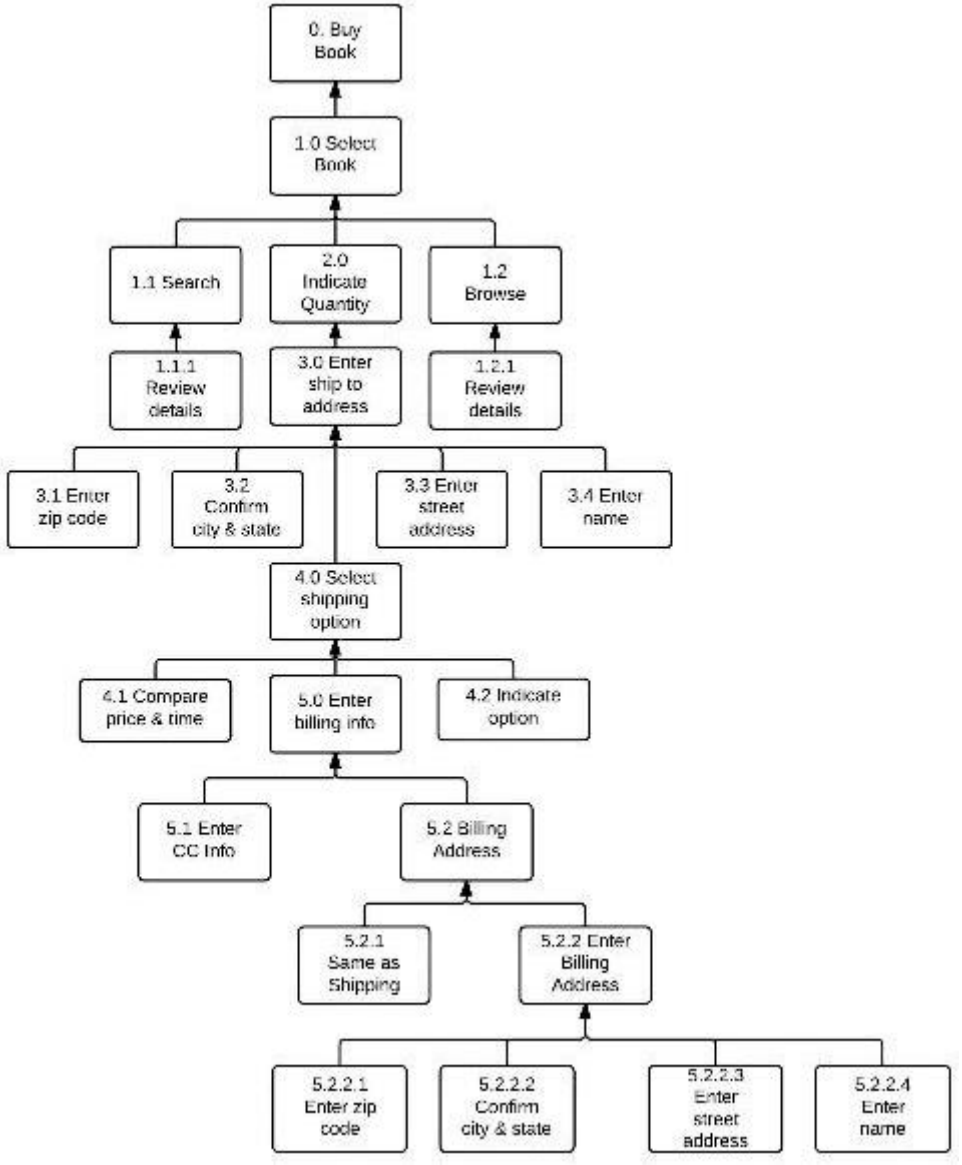
Place Order



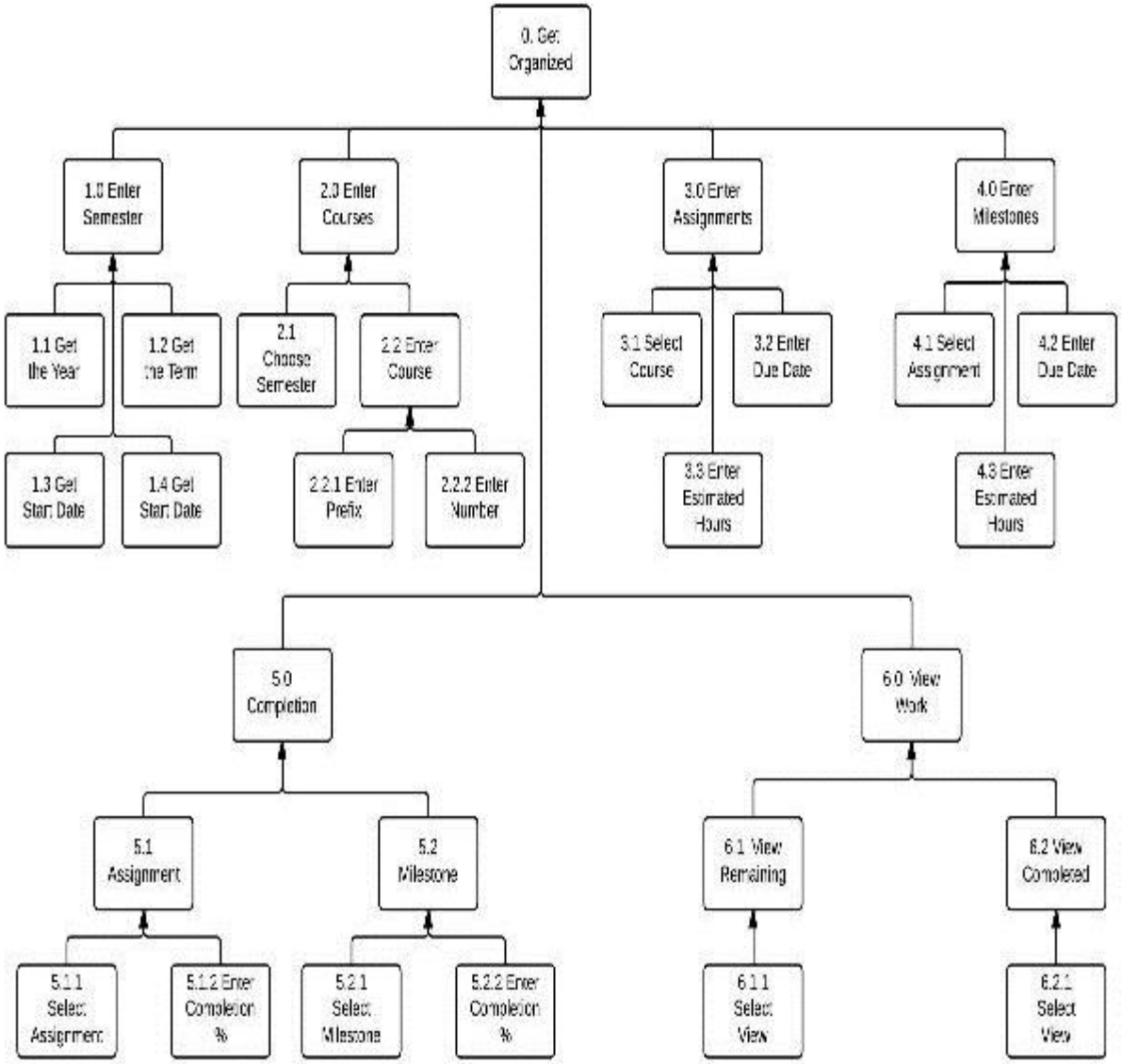
Another example using HTA

- Goal: Organize Homework

Task decomposition

- Enter the semester
  1. Get the year
  2. Get the semester
     a. Get the term
     b. Get the semester start date
     c. Get the semester end date
- Enter the courses for a semester
  1. Choose the semester
  2. Enter a courses (prefix, number, optional title)
- Enter assignments for courses
  1. Select or enter Course Prefix, Number
  2. Enter due date
  3. Enter estimated number of hours remaining for assignment
  4. Enter milestones for assignment
  5. Enter estimated number of hours remaining for milestone
- Complete assignments or milestones
  1. Select the course
  2. Mark an assignment as complete
  3. Mark a milestone as complete
- View work remaining
  1. Select the view type

HTA Diagram


0. Get Organized
1.0 Enter Semester
2.0 Enter Courses
3.0 Enter Assignments
4.0 Enter Milestones
1.1 Get the Year
1.2 Get the Term
2.1 Choose Semester
2.2 Enter Course
3.1 Select Course
3.2 Enter Due Date
4.1 Select Assignment
4.2 Enter Due Date
1.3 Get Start Date
1.4 Get Start Date
2.2.1 Enter Prefix
2.2.2 Enter Number
3.3 Enter Estimated Hours
4.3 Enter Estimated Hours
5.0 Completion
6.0 View Work
5.1 Assignment
5.2 Milestone
6.1 View Remaining
6.2 View Completed
5.1.1 Select Assignment
5.1.2 Enter Completion %
5.2.1 Select Milestone
5.2.2 Enter Completion %
6.1.1 Select View
6.2.1 Select View

Decide on what you want to prototype

- Due soon! More details next class.
- Default Project – college student homework management application