Homework #1

• Project Teams and Tracks
• See the web
  • http://cs.nyu.edu/courses/spring04/G22.2280-001/homework_1.htm
• Due Feb 16, 2004
Project Tracks

• Each team topic is a vague statement about a certain type of solution. Part of your teams project is to take that statement and flesh it out into a vision with specific scope and goals. I have intentionally made these vague to allow your creativity and vision to shine through. You should think about what the future will hold instead of what the presently exists.
# HW1 Artifacts

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Per student: 60
Project Tracks

- **Airlines Res** - trips to mars? Booking a helicopter? Personal charter hovercraft?
- **Autonavigation** - get into the vehicle and it drives you there, how would that work?
- **Online Childcare System** - watch the kids, arrange pickup, delivery.
- **Electronic Voting** - how about using a kiosk on the street? How about a direct democracy vs. representative democracy?
- **Future Web - The WWM** - instead of the web, what should we have? Death to the browser, but what would replace it?
Project Tracks

- **Cashless Society** - no paper, no credit cards, maybe iris recognition, or DNA?
- **Virtual University** - take classes completely remotely?
- **Cashier-less Checkout** - No scanning, use RFID tags, what would that look like? What about returns?
- **Subway of the Future** - no metro cards or tokens? An IP network like system of small subway cars that move like packets through a matrixed network of stations, in all three dimensions, like a really elaborate elevator system that goes not just up and down but between buildings!
Design Process

An iterative process for designing great UIs
Process

- Steps and activities
- Executed in a sequence
- Iterative means we may restart and redo an activity later
- Loosely based on the Unified Process (UP) –
Parallel Workflows (Disciplines)

- Information Gathering
- Analysis
- Design
- Implementation
- Testing & Fixing
- Training
- Documentation Creation
- Packaging
- Managing the project
Different Phases

• Inception (I)
  – Goals
  – define the general business case for the project
  – Define the stakeholders
  – Get a vague idea of the problem being solved (opportunity) and the solution possibilities

• Elaboration (E)
  – Building a prototype of the application – more structural than pretty

• Construction (C)
  – Building the parts of the application, testing them, fixing the bugs.

• Transition (T)
  – Getting the application ready to run in production.
  – Packaging, documentation, training, …

• Production (P)
  – Real users using it and in the process needing support, finding hidden bugs and requesting new features
Iterations

• The complete set of disciplines done in each iteration but with different levels of emphasis.

• Each PHASE is one or more iterations.
  – I 1 iteration
  – E 1 to 3 iterations
  – C 1 to 10 or more iterations
  – T 1 to as many minor releases as needed
  – P 1 until decision to do a new major release

• Iterations are usually between 1 week and 6 weeks. Average around 4 weeks (except inception.)
### Relative amount of work in each phase v. discipline

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**Phases:**
- Inception
- Elaboration
- Construction
- Transition
- Production
We are initially going to focus on

• Inception phase
• Information Gathering & Analysis Disciplines
• Later in the course we will change our focus to Analysis & Design, then Testing, …
Information Gathering

• Somewhat like requirements gathering but that implies analysis, too.

• Techniques
  – Observation
  – Interviews
  – Reviewing Existing Systems
  – Document review and business knowledge research
Analysis

- Techniques
  - **Glossary of terms creation**
  - **User Analysis**
    - User Goals definition
    - User type identification / classification (taxonomy)
    - Task Analysis
    - Use case creation
  - **Business Domain Analysis**
    - Business entities (objects)
    - Identifying business processes
    - Information Analysis
  - Requirements Definition
Design

• Architecture
  – Presentation Logic – “Visible” Interactions of UI
    • Look, Feel, Usability patterns for design
    • Technology of the UI
  – Business Logic – rules of application. Its business related behaviors
  – Service (Data Management) Logic – storage, retrieval, persistence, communication
Design

• Techniques
  – JAD (Joint Application Dev) / CDS (Collaborative Design Session)
    • Team works together with users to sketch out possible designs on the whiteboard
  – Information Architecture
    • Taxonomy / Object Hierarchy
    • Task / Feature Prioritization
  – Mockups / Prototypes
    • Low Fidelity – Paper drawings
    • Medium Fidelity – Wireframe Application
    • High Fidelity – Sample application UI
Implementation

• Building the end product deliverable
• Creating Content
• Writing Code
• Drawing screens
• Creating navigation
• Creating Data / gathering data
• Fixing bugs
Testing

• Types
  – Unit
  – Integration
  – Usability
    • Navigation
    • Ease of use
    • Aesthetics
    • Content / functionality
  – User Acceptance Testing (UAT)
  – System Deployment Testing
Documentation

- Online and/or paper
- HTML, PDF, Word, help format, txt
- Creating Developer docs
- Creating User docs
- Creating User tutorials
- Creating User Help documentation
- Creating System Administration docs
  - Installation, Runtime, Maintenance, Errors, …
Training

- User
- Developer
- Sys Admin
Design Process – In Depth

Information Gathering and Analysis Disciplines
Information Gathering - Observation

• Watching users doing what they do
• Looking for general classes of behaviors / actions based on seeing many specific behaviors. Ex:
  – Duplicating a contract, duplicating a report, duplicating a brochure
  – A general class of behaviors called “Copying”
• Understanding the steps taken to achieve a goal.
• Understanding those goals.
Information Gathering - Interviews

• Using the observations to discuss with the user.
• Getting a better understanding of the goals, steps and terminology of the user.
• Documenting the users relative frequency of users actions
• Understand the general characteristics of users including age, education, expertise, computer familiarity, training, …
Information Gathering – Existing Systems

• Examining the functionality present in existing software and devices used by the user currently.

• Helps to add information about what features, functions, tasks, goals, sophistication the user may already expect to be supported by any new system.
Information Gathering – Doc review and business knowledge research

- Examining the literature about the business domain
- Gather general business processes, terminology, rules, roles, …
- Adds more information to the analysis
- See how others maybe doing it differently that these user’s have
Analysis - User Analysis

• User Goals definition
  – What is it that motivates the users to do the business process?
  – If an done on behalf of another, what is the indirect user’s goals?
  – Find abstract classes of goals. Ex: Make Money is a general class of goal. EarnInterestFromSavings, EarnMoneyByInvestingInTheStockMarket, GetAPaycheck are specific examples of that general goal.
  – Define the users that share that goal.
Analysis - User Analysis (2)

- User Types
  - Determine abstract classes of users from specific users and their shared characteristics.
  - Define those characteristics.
  - Ex: Mike, Sheng, Sam, Cindy, Logan and Oleg are present in class. Except for Logan and Oleg, the rest are here to learn the material presented in the class and they pay to attend the class. They are all Students. Oleg is here to help teach the class and is getting paid to do this. Logan is their to teach the class and gets paid to do so. Oleg is a TA. Students and TAs are abstract classes of users from this group of concrete users.
  - Types are often assignable based on shared goals, characteristics, abilities, etc.
  - Types are also often equivalent to title with the business.
Analysis - User Analysis (3)

- Task Analysis
  - Determine abstract classes of tasks that are done by the users.
  - Define those characteristics.
  - Define the relationships between them.
  - Define the context that they are executed.
  - Define the business process that involve doing a task.
  - Ex: Students do the following things:
    - Sit in a seat, take out a notebook, listen to the professor (intently), ask questions – what tasks and process is this?
    - Review the material in course, sit in a seat, take a copy of a handed out group of papers, read the papers and answer the questions, return the booklet, leave. – what is this?
    - These are part of a larger business process – what is that?
  - Define the business processes and what tasks are used by/ shared by those business processes (BP or Biz Proc)
Analysis - User Analysis (4)

• Use Case (UC) Analysis
  – Describe how the user (Actor) would use the system under design (SUD).
  – State the conditions that must be to begin the UC
  – Describe the Goal for the UC
  – Describe the steps that the user would do.
  – Do NOT describe what happens inside the SUD.
Analysis - Use Case Example

- UC0001 - GetMoneyFromATM
- Preconditions: Have account, card, pin
- Scenario:
  1. The Use Case Begins With (TUCBW) the user inserting their card in the SUD.
  2. The SUD displays a screen and asks for a PIN.
  3. The users types in their PIN
  4. The SUD authenticates the users PIN. If invalid display “invalid PIN” and terminate the scenario else continue.
  5. The SUD displays a list of accounts and operations: GetMoney, DepositMoney, CheckBalance and Exit.
  6. The user selects GetMoney.
  7. The SUD promts for the account and amount.
  8. The user enters the acct and amount.
  9. The SUD debits the account and ejects money.
 10. The user takes the money.
 11. The SUD asks if they’d ilke to do another operation.
 12. The users selects “No”.
 13. The SUD exits and presents the welcome screen.
- Postconditions: the account is debits properly.
Analysis - Glossary

• Create a list of terms that are relevant to the business domain
  – **Terms** – specific terminology used in this business domain. Ex: DDA, IRA, Trade, Equity, Swap, Market maker, ATM, ...
  – **Stakeholders/Users** – can be direct users (employees) or indirect users (customers). Ex: Teller, Broker,
  – **Actors** – a class of user of a system. Ex: Teller, Customer, Administrator
  – **Roles** – a set of behaviors that an Actor may engage in based on certain goal(s). Ex: Head Teller, Junior Teller, Manager, High Value Individual, ...
  – **Business goals** – the business benefit that will be derived from a given business process. The reason you request a business process is executed. Ex: Pay For House, Earn Money, Secure My Savings, ...
Analysis – Glossary (2)

- Business **processes** – a set of tasks/activities that accomplish a **goal**. Usually something someone would pay for as a unit i.e. you can put a price for that process to be done. An actor playing a role will initiate execution of a business process. Usually stated as a VerbNoun phrase or as a verb phrase. Ex: GetCashiersCheck, MakeDeposit, ...

- Business **objects / entities** – high level physical and conceptual things that are manipulated or interact in the conducting of a business process. Business functions/operations – high level operations. Ex: Deposit, DepositSlip, TellerWorkstation, SavingsAccount, ...

- Business **rules/calculations** – rules that are specific to this business. Ex: calculating the vacation days for you business. CalculateInterestOnAccount.

  • Usually a sentence or two
  • Including synonyms and related terms
  • Created in parallel with other analysis techniques.
Analysis - Glossary Example

• **Professor** – a person who has knowledge of the subject being taught. Generally slightly eccentric. Syn: instructor, lecturer

• **Student** – a person who attends lecture, listens intently, reads all assigned readings, studies extremely hard and does all homework faithfully.

• **TA (Teaching Assistant)** – helps the professor to teach the class by assisting students, grading homework and proctoring tests. Usually look overworked and underpaid.

• **Homework** – a deviously created set of tasks designed to insure that a student learns the critically important lessons of a course. Often seen by students as a pointless waste of precious sleeping time.

• **GradeHomework** – a business process. Steps are: AssignHomework, DoHomework, SubmitHomework, GradeHomework, ReturnHomeworkToSubmitter.

• **SubmitHomework** – business activity (step) part of a business process (GGradeHomework).

• **TakeNotes** – a business process

• **Notes** – a business object
Widgets & other UI thingies

Intro the concepts and terminology of UI Design
The Desktop

- Desktop shortcuts
- Task bar
- Quick Launch
- Apps running
- Notification Area
- Application running non-minimized
Accelerator Key

Mnemonic Key ("A")

"..." To a Window (usually a dialog)

Menu Separator

Cascade indicator
Print Dialog Box

- Dropdown Listbox
- Group
- Label
- Radio Button
- Spin control
- Checkbox
- Editable field

The “What’s this” control

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Dropdown list box closed and opened
Palettes

Tool Palette
Selecting a region of the workarea
Pointers (Cursors)

- Normal Select
- Help Select
- Working In Background
- Busy
- Precision Select
- Text Select
- Handwriting
- Unavailable
- Vertical Resize
- Horizontal Resize
- Diagonal Resize 1
- Diagonal Resize 2
- Move
- Alternate Select
- Link Select

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Families, Typefaces & Fonts

This is a font – 32pt Arial
This is a font – 24pt Arial
This is a font – 20pt Arial
This is a font – 16pt Arial

This is a font – 32pt Arial
This is a font – 24pt Arial
This is a font – 20pt Arial
This is a font – 16pt Arial

Typeface is Arial
A font is a typeface of a specific size
Typefaces

Typeface is Arial
Typeface is Trebuchet MS
Typeface is Bookman
Typeface is Courier New
Typeface is AvanteGuarde
Typeface is Comic Sans MS

All these typefaces are the same size (32 pt).
Notice the “x” sizes are similar.
Typeface Tools
Text Justifications

Left justified text

Right justified text

Centered justified text

Fully justified it stretches to both margins

Tool bar icons for justification
Typographic Terms

• Uppercase ("WORD")
• Lowercase ("word")
• Mixedcase/Titlecase ("Word of the Day")
• Serifs vs. San Serifs
Color Theory

• White light is composed of all the wavelengths of visible light

• Our eyes have Red, Green and Blue sensitive cells (cones) and light intensity cells that are insensitive to color (rods).

• Mixing Red, Green and Blue light will be perceived as white light

• That’s how an RGB monitor works
Color Cube
Luminance (Brightness) Range
Color RGB

- RGB     Red     Green     Blue
- Range 0-255 (0,0,0) tuple
  - 24 bit color - 3 bytes - 1 per color
  - Red(255,0,0)     Green(0,255,0)     Blue(0,0,255)
  - Cyan(0,0,255)     Magenta(255,0,255) Yellow(255,255,0)
  - White(255,255,255) Black(0,0,0)      Gray (128,128,128)

- Color complements (adding one subtracts the other from the overall color balance)
  - Red and Cyan
  - Green and Magenta
  - Blue and Yellow
  - White and Black
Color HSV

- HSV  HUE  SATURATION  VALUE
- Hue - Relative Color
- Saturation (Chroma) - the amount of color intensity v. gray
- Value (Luminance) – the amount of white added to the color.
Color CMYK

- CMYK Cyan Magenta Yellow black
- Used in the printing industry

\[ \text{Cyan} + \text{Magenta} + \text{Yellow} = \text{Black} \]
Light vs. Pigments

- Light is additive
- Pigments are subtractive
- Add R G B lights together you get **WHITE**
- Add R G B pigments together you get **BLACK** (well more like a muddy brown)
- You see what colors are reflected from an object (the object absorbs the colors you don’t see).
- The red apple reflects red light (and absorbs green and blue).
- The green apple reflects green light (and absorbs red and blue).
- Is the color you see really the color of an object or is it just the opposite?
Foreground vs. Background

This is the foreground of the document.

Background

Cyan Highlight

Splitter

Shangle (Resizer)
Color chooser for windows
Color “warmth”

- A good primer on graphic design ideas and concepts
  http://www.mkgraphic.com/chap00.html
Resources

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