CSE 403

Design

What is "design?" A plan or drawing not useful. A plan or drawing not u to show the look and function or w of ir a building, garment, or other oh: Useful. Sound is built or made.

What is "design?"

Vision/Requirements

Fonts

Logos/Iconography

User interface

User experience

(Photoshop) Mockups

HTML/CSS/JavaScript(?)

What is "design?"

- Part of the requirements process?
- Drill down from architecture?
- Specification vs. implementation?
- Artistic/Creative vs. engineering?
- Strategic vs. tactical?

What is "design?"

- Deep, emotional, visceral expression of a product/company/brand
- What a product does/How it is used
- Human interface without regards to implementation
- "Pretty pictures"

Examples of good design?

















Iconography



We're blowing off a lot

Vision/Requirements

Fonts

Logos/Iconography

User interface

User experience

(Photoshop) Mockups

HTML/CSS/JavaScript(?)

•We're going to side step most graphic design "stuff"

- Important but not necessarily
- "engineering"

•How are you going to get this aspect done?

The **user interface**, in the <u>industrial design</u> field of <u>human-machine</u> <u>interaction</u>, is the space where interaction between humans and machines occurs. The goal of interaction between a human and a machine at the user interface is effective operation and control of the machine, and feedback from the machine which aids the operator in making operational decisions. Examples of this broad concept of user interfaces include the interactive aspects of computer <u>operating systems</u>, hand <u>tools</u>, <u>heavy machinery</u> operator controls, and <u>process</u> controls. The design considerations applicable when creating user interfaces are related to or involve such disciplines as <u>ergonomics</u> and <u>psychology</u>.

User experience

User experience (UX) is the way a person feels about using a product, <u>system</u> or service. User experience highlights the experiential, <u>affective</u>, meaningful and valuable aspects of <u>human-computer interaction</u> and product ownership, but it also includes a person's perceptions of the practical aspects such as utility, ease of use and efficiency of the system. User experience is subjective in nature, because it is about an individual's feelings and thoughts about the system.

Information architecture

Information architecture (**IA**) is the <u>art</u> and <u>science</u> of organizing and labelling <u>websites</u>, <u>intranets</u>, <u>online communities</u> and software to support usability.[1] It is an emerging discipline and <u>community of practice</u> focused on bringing together principles of <u>design</u> and <u>architecture</u> to the <u>digital</u> <u>landscape</u>.[2][[]<u>page needed</u>[]] Typically it involves a <u>model</u> or <u>concept</u> of <u>information</u> which is used and applied to activities that require explicit details of complex <u>information systems</u>. These activities include <u>library</u> systems and <u>database</u> development.

What does this mean?

- Jser experier aren't so helpfull. Inform mitiOns aren't so helpfull. Inform mitiOns aren't so helpfull. Mese definitions aren't so helpfull. Mese definitions aren't so helpfull.

Who does this stuff?

- Artists, creative types, design school graduates
- Computer scientists, HCI specialist
- Engineers, product managers
- You!

Practically speaking

- How do users (humans) get "things" done
- How does functionality get exposed and utilized?
- How does a product make users feel what we want them to feel?
- How do express meaning and functionality effectively?

More practical

- What do the screens/application look like?
- What are the steps a user must do to accomplish a task?
- What do various buttons, knobs, sliders do?
- How do we get users to do what we want them to do?
- What state do we need to represent and how?



From requirements to implementation

- Users, use cases, functional specifications tell us what
- Implementation is the realization of those requirements
- Design is the piece in the middle -- what are screen flows? what do the screens look like?

Gross (incorrect) generalization

- User experience is the flow, states, and transition presented in an application
- User interface is the look and feel
- "UI" elements -- buttons, sliders, drop downs, etc. and what they do are sort of between User Experience and User Interface
- Information architecture is about data design and representation with "deep semantics"

Alternative (traditional) view on design

- Drill down from architecture with expresses requirements of the and conquer strategy from with ision and the coalescing of rections, database schemas, state machine sugrams

8 golden rules for UI/UX (Schneiderman)

- 1. Strive for consistency.
- 2. Give shortcuts to the user.
- 3. Offer informative feedback.
- 4. Make each interaction with the user yield a result.
- 5. Offer simple error handling.
 - 6. Permit easy undo of actions.
 - 7. Let the user be in control.
 - 8. Reduce short-term memory load on the user.



(from Designing the User Interface, by Ben Schneiderman of UMD, noted HCI and UI design expert)

UI Building Blocks

- Buttons
- Check boxes
- Radio buttons
- Sliders
- Text boxes

- Text fields
- Drop down menus
- Dialog boxes

HTML Pages!

Ul elements: examples

Text box Allows you to input text		Text field (or paragraph) Bigger than a text box		
	Dialog Box	1		
Radio buttons or multiple ch You can only select 1 A B C D	Add by URL URL: If you know the address address here. Make the calendar Add Calendar Can F G H	s to a calendar (in iCal format), you can type in the publicly accessible?	But Do t	Lider t a value t a value ton the action Jbmit

More



January	•
February	366
March	
April	•



Menus



Combo boxes

Pig		•
Bird		
Cat	Ν	
Dog	N	
Rabbit		
Pig		

Speech input ala Siri, GPS tracking, eye tracking, sensors, etc.

What about output?

- Text (fonts, styles, css)
- Graphics
- Rich media (video, audio,)

Trivia:The tag was not part of the original HTML spec. Its inclusion was revolutionary.

Pages: Fundamental unit of presentation of the (early) web

- A page of HTML (a document) is/was a key abstraction of the web
- Data was mostly read only but HTTP get and post allowed data to be sent from client (browser) to server -- interactivity!
- Page to page transitions based on user input was and remains a key concept
- AJAX changed the paradigm
- "Fat apps" implemented in Java or Flash on the client side also were not page oriented but were also popular
- AJAX has been a big driver of change
- Native mobile apps also changing the game

Requirements drive design

Requirements drive design

Requirements

Design

- Actors
- •Use cases
- •Functional specification



- •Data model (schema)
- •Class hierarchies
- •Classes
- •User Experience flows
- •User Interface

Information Architecture -- more than just data design and representation

Design drivers

- •What are the things that need to be represented?
- •What are their subcomponents (attributes)?
- •How do they interact?
- •I-I, many-I, many-many?



Representations

- •Data model (schema)
- •Class hierarchies
- Classes
- Method calls
- •Can UML help?

User Experience

Model User Experience/Interactions with a state machine



State machines

- Nodes are states, edges are inputs
- Satisfy use cases?
- What's the state at the nodes
- Complete details might not be necessary
- Augmented by text
- Nodes realized with UI representation
- UML: tool and formalism for state machines

(Time) sequencing diagrams



UML

- Unified Modeling Language
- Design tool...or is a requirements tool?
- Tools to help represent activities, actors, business processes, data representations, classes, control flow...
- Standardization for managing object oriented software engineering
- Tools and applications exist
- Helpful but....
- We'll talk about this formalism in a few days





- Screen, page, "pixel" representation
- What state am I in?
- What are the inputs to get to a new state?
- Use user interface elements
- Are we being too restrictive?
- What about streaming media/async outputs?

UI Example

•Good UI dialog?

•Did the designer choose the right components? (assume there are 20 collections and three ways to search -- by title, author, relevancy)

LIBSYS: Search	
Choose collection:	All
Phrase:	
Search by: Title	•
Adjacent words 🔍 Yes	o _{No}
	Default Cancel OK

Complex (multi-step) tasks



Lighting up new research

Conversion of PETRA III to a brilliant X-ray source

Exactly one year after the official PETRA III construction start, the almost 300 metres long experimental hall, including the outside facilities, was handed over to DESY on July 1, 2008.

The erection of the hall was completed in only two months. As early as November 2007, the roof was closed and the topping-out ceremony was celebrated in the presence of German research minister Annette Schavan. The foundation, which rests on 20 m deep

piles and the world's longest single-sibb concrete plate, will ensure a nearly vibration-free experimental environment. An area of 7000 sgm is now available for 14 beamlines and up to 30 experimental stations. They are designed to make the

FIRST ISSUE

With this new PHOTON SCIENCE Newsletter we would like to inform you about the activities and the unique perspectives coming up at DESY for research with photons. With up-to-date research highlights and stimulating news we hope to inspire scientist who are already involved but also those who may find interesting links to their own activities.

We are looking forward to seeing you at DESY!

Edgar Weckert Acting Director in charge of Photon Science

Accelerator | Photon Science | Particle Physics

Deutsches Elektronen-Synchrotron A Research Centre of the Helmholtz Association



Facade of the almost 300 metres long new PETRA III experimental hall on the DESY site. The facade inspired the level of this photon science newsister.

best use one of the most brilliant X-ray beam workvide, with a maximum vorkvide lowest emittance hard X-ray brilliance of greater than 10³¹ ph/s mm² source. About 7/6 of the PETRA rith has arrad² 0.1 % BW). Innovative construction technology was applied to ensure optimal stability of the fort. The first objects on the floro verve in the beginning of 2009.

perimental hutches leaving only narrow

"canyons" to access the experiments.

First components such as diffractome-

be installed starting in October 2008.

In parallel, the whole storage ring has been

ters, monochromators and detectors will

concrete shielding elements for the ring The PETRA III project is well on track tunnel. Immediately afterwards optios and we are looking forward to welcome hutches were assembled and are now first users in summer 2000 for test being completed. Up until spring 2000 experiments. the now embry area will be filled with ex-

> - INFO IIII-PETRA III Homepage: petra3.desy.de Link to the next PETRA III workshops: petra3.desy.de/hews/workshops

Newsletter creator software

How does a publisher create this?
What are the UI elements?
How does the content get poured in?
Can you re-use previous newsletters? (templates?)

Multi-step inputs: WYSIWYG

Kent Test 1

age header body footer monkeyrewards		save & exit
footer style footer text footer link social bar style utility bar style		
background border text align #FAFAFA 0 px None Center Tips: Set the background color and border for your email's footer social bar.		
Use this area to offer a short teaser of your email's content. Text here will show in the preview area of some email clients and in Facebook news feed posts.	A hide them	Color Themes categories
	C,	collegas E
		themes
Heading 1	E	atlanta cola big machine company blazer and khakis gov
		hospital blues
		mr. gates mr. jobs solid engineering

Multi-step inputs: Wizards

🕷 Microsoft Office 2003 Custom Installation Wiza	rd 🔳 🔽
Select the MST File to Save 4 of	24 🚽 🎑
You can save your changes in the MST file that you opened, or enter the name and path of a new MST file. Name and path of MST file:	
C:\Office 2003\Office 2003 Accounting custom setup File.MST	B <u>r</u> owse
Help Cancel < Back Next >	Finish

Multi-step inputs:Text

H2 H3 H4 B $I = \frac{1}{2} \equiv 60$
This is a H2 title
This is a H3 title
[external link](http://site.com)
[internal link](page:33)
em text
string text
·····

Where to get help?

- Do you have the skills/talent to UI/UX/IA or the other parts of "design?"
- Classes: CSE 440/441, CSEP 510, Design School -- but this doesn't help you today!
- 99 Designs, outsource design firms -- but this costs time and money
- Friends willing to help?
- Do it yourself
- Twitter bootstrap
- "Appropriate" ideas/inspiration -- and even code -- from other places

"Appropriation"







- Design: Is it engineering?
- User experience, user interface, information architecture might be
- The discipline is wide and deep
- More than just a drill down from architecture
- Close to corporate/product strategy/marketing
- What if you don't have the skills/talent?