Introduction to HCI (Human Computer Interaction)

Fall 2019
HCI Design Process

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Courses, projects, papers, and more:
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Today

- Administrivia - 5 min

- Discussion on pre readings - 10 min

- HCI design process - 30 min

- In-class activity - 30 min

Homework…

▸Design Thinking exercise

▸Prototypes: email to Mahmood Jasim

Due by Now…

▸Check the website

▸Are you able to see our Piazza posts? each others' posts?

▸Ask questions publicly, so other students can see/answer your questions

▸Feel free to comment/reply to each other's questions and use Piazza as a learning resource

▸Questions? [5 min]

Discussion on design thinking activity and Norman reading

▸What the heck did we actually do last class??? How did the rest of the exercise go???

▸Get into pairs and take turns (2 min each) answering:

  ▸What surprised you? or

  ▸What you disagreed with?

Learning goals

▸after this lecture, you should be able to:

  ▸contrast the central principles of user-centered versus technology-centered design

  ▸describe the stages of the HCI process and different types of goals each might have

    ▸ know the roadmap for deploying evaluation techniques in different stages

    ▸ identify important features of the process (e.g., iteration); LATER lectures will discuss more features

    ▸ define and identify stakeholders

What is HCI?

A discipline that applies Human-Centered Design methods to the design of interactive technologies… and increasingly, uses the Design Thinking framework.

Different attitudes toward design

technology-centered

vs.

user-centered design

Technology-centered design

▸natural to design for all kinds of reasons …

▸technology-centered design

  ▸design decisions are guided by technology

▸prevalent attitude in real world because . . .

  ▸technology is fun!

  ▸making novel things is engaging – for the designer

  ▸if it seems like it should work well – or looks cool – people often buy it, too.

Technology-centered design

▸ Technology- (or curiosity-driven) design:

  ▸ can be the basis of radical innovation that eventually will change peoples' lives.

  ▸ Not necessarily a bad thing.

▸ The problem?

  ▸ risk of leaving out real people, who have real problems right now.

Try: google "wearable phone"

▸cool!

▸but - what would it actually be like to use these?

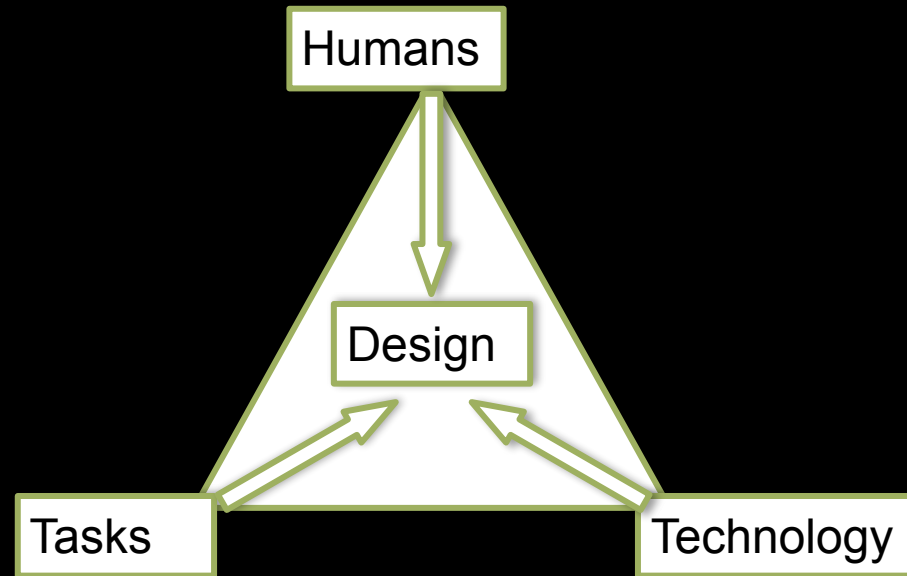# Segway:

what is it for?

i2 Personal Transporters

x2 Personal Transporters

Advanced Development

Robotic Mobility Platforms

Attitude of user-centered design

incorporate users into the design process

spectrum of attitudes towards design

technology

▸attitude of technology–centered design

> ▸progress made by technological advances
>
> ▸goal is to show off gadgets and inventions

▸attitude of designer-centered design

> ▸progress made by considering designers' intuition
>
> ▸imagining what the user will do and feel

▸attitude of user-centered design

> ▸incorporating the users into the design process
>
> ▸empirical studies integrated early into the design
>
> ▸users as part of the development team

user

HCI design process

Why do we need a process?

human activity needing better support	? →	usable and useful interactive system that addresses this
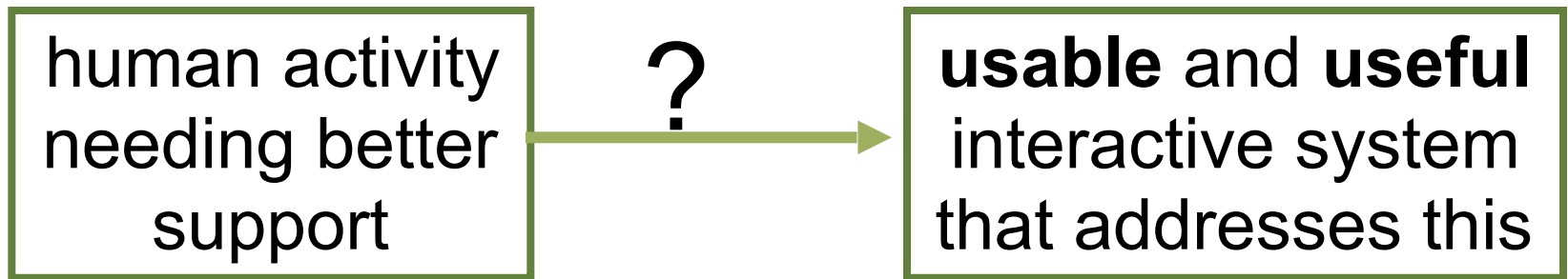
How do you get from problem to solution?

A map would help.

Process stages and their goals

pre design: understand the problem

early design: explore design space

mid design: develop the chosen approach

late design: integrate and start to deploy

always: evaluate and prototype

Pre design questions

‣understand the problem

    ‣problem = "human activity needing support"

    ‣do users really have the problem you think they do?
is it an important problem for them?

    ‣who are the users? who cares? what non-users are involved in the problem and its potential solution?

    ‣ what are your users like? how varied are they? expertise, abilities, priorities, special needs, constraints, ….

    ‣ what is the task? what are they really trying to do, and what is getting in the way?

    ‣ what properties must a solution have?

Early design questions

explore design space

▸ have you considered all relevant approaches?

▸ what are the 'metrics' that you should be considering as you compare approaches? feasibility, price, complexity, functionality, fit to company focus/intellectual property, …

▸ what are the high-risk elements of your likely approach, and can you address them?

at this stage - don't invest effort or love. Be quick, dirty, no attachment.

→ **CHOSEN DESIGN APPROACH**

Mid design questions

develop / confirm chosen approach; reduce risk

- ▸ are there major "elements" of your design that can be advanced separately? e.g. layout and flow, look-and-feel, technical interface implementation
- ▸ what are the major questions / uncertainties / risks associated with each design element? **focus on these.** *minimize time on problems you know you can solve.*
- ▸ what user input will you need to verify your design progress? when, where; how much will it cost and can you afford it?
- ▸ what prototypes do you need to support problem solving, including getting user input on your design?

→ **DESIGN ELEMENTS CONFIRMED & MOCKED-UP**

Late design questions

integrate and field-test

there shouldn't be a lot of questions at this stage if you did the earlier stages right.

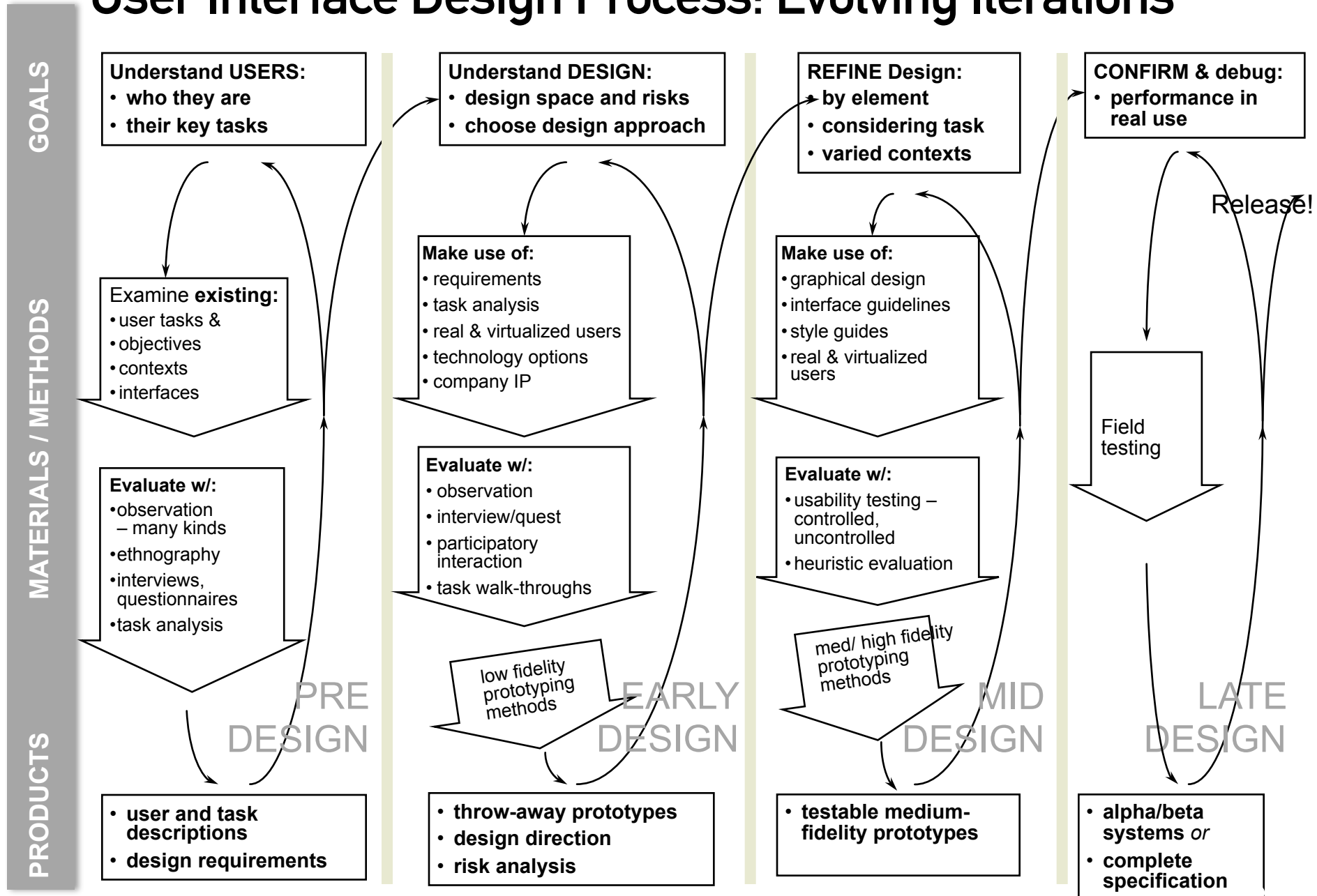‣ integrate the different design elements

‣ final delivery platform

‣ put systems in real users' hands in real contexts for longer durations
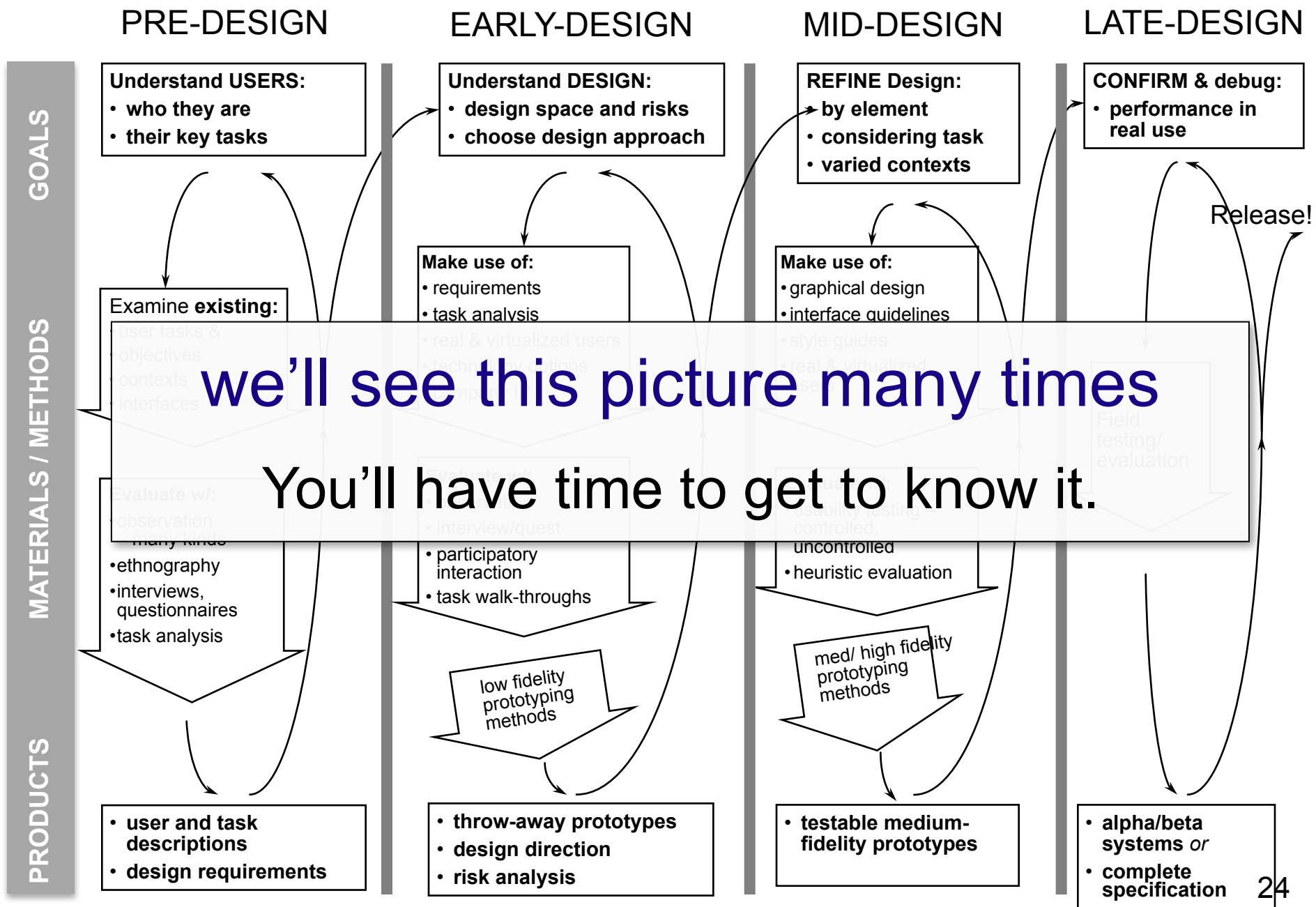
‣ fine-tune, debug

→ **RELEASEABLE SYSTEM!**

What does this process look like?

The process emerges...

User Interface Design Process: Evolving Iterations

GOALS

Understand USERS:
- **who they are**
- **their key tasks**

Understand DESIGN:
- **design space and risks**
- **choose design approach**

REFINE Design:
- **by element**
- **considering task**
- **varied contexts**

CONFIRM & debug:
- **performance in real use**

Release!

MATERIALS / METHODS

Examine **existing:**
- user tasks &
- objectives
- contexts
- interfaces

Make use of:
- requirements
- task analysis
- real & virtualized users
- technology options
- company IP

Make use of:
- graphical design
- interface guidelines
- style guides
- real & virtualized users

Field testing

Evaluate w/:
- observation
  – many kinds
- ethnography
- interviews, questionnaires
- task analysis

Evaluate w/:
- observation
- interview/quest
- participatory interaction
- task walk-throughs

Evaluate w/:
- usability testing – controlled, uncontrolled
- heuristic evaluation

low fidelity prototyping methods

med/ high fidelity prototyping methods

PRE DESIGN

EARLY DESIGN

MID DESIGN

LATE DESIGN

PRODUCTS

- **user and task descriptions**
- **design requirements**

- **throw-away prototypes**
- **design direction**
- **risk analysis**

- **testable medium-fidelity prototypes**

- **alpha/beta systems** *or*
- **complete specification**

K MacLean - derived from version by Saul Greenberg (U Calgary)

User Interface Design Process: Evolving Iterations

	PRE-DESIGN	EARLY-DESIGN	MID-DESIGN	LATE-DESIGN

GOALS

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REFINE Design:
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Release!

MATERIALS / METHODS

Examine **existing:**

Make use of:
- requirements
- task analysis

Make use of:
- graphical design
- interface guidelines

we'll see this picture many times

You'll have time to get to know it.

- ethnography
- interviews, questionnaires
- task analysis

- participatory interaction
- task walk-throughs

- uncontrolled
- heuristic evaluation

low fidelity prototyping methods

med/ high fidelity prototyping methods

PRODUCTS

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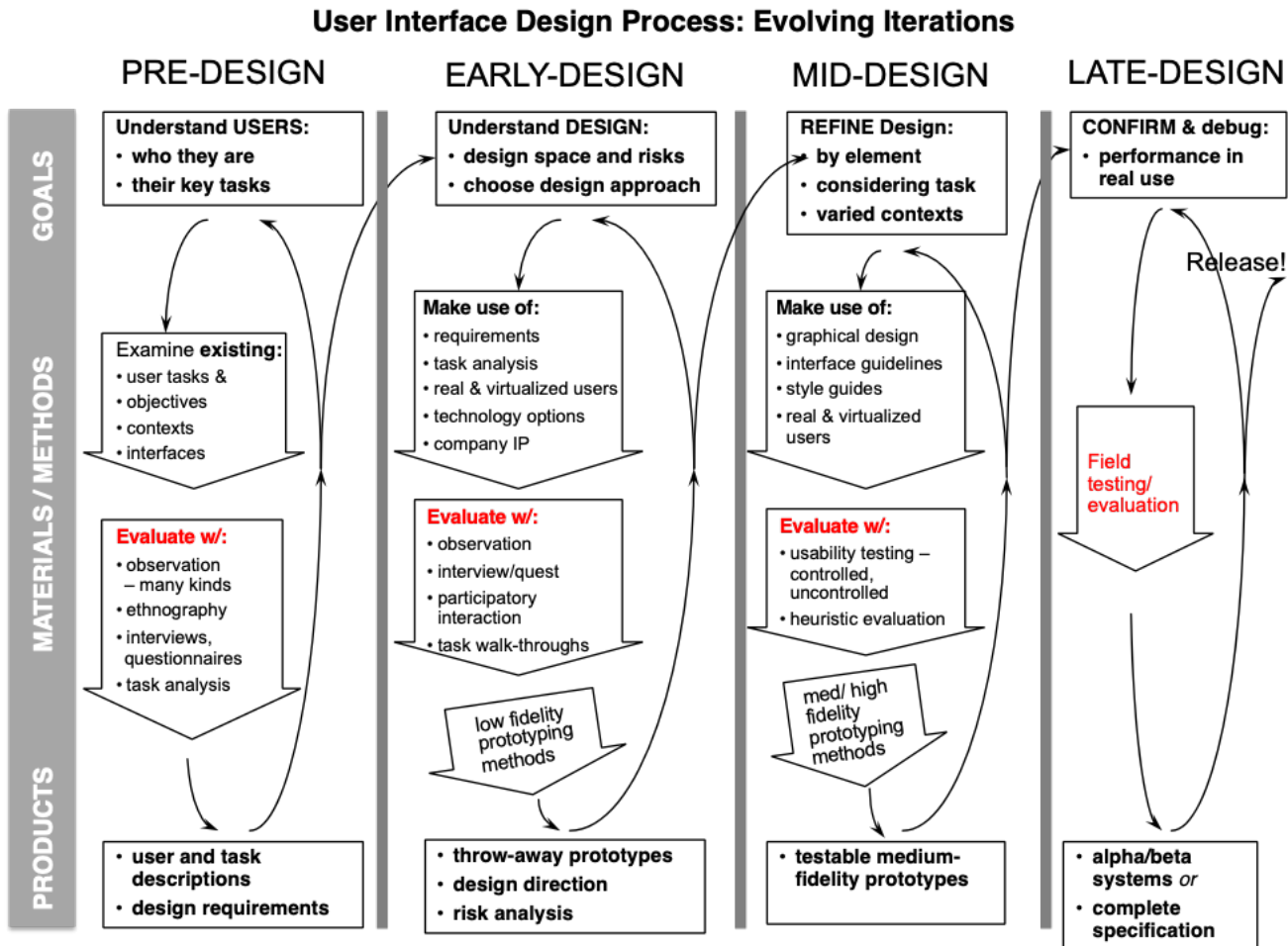- **complete specification**

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Key Features

- **stage evolution**:
  in goals, methods, products

- **Iteration**:
  both within and between stages

- **methods**:
  used throughout, or stage-specific

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Role of evaluation in stages

Why does every stage has an evaluation component?

User Interface Design Process: Evolving Iterations

Role of evaluation in stages

Why does every stage has an evaluation component?

Because we must connect our design progress to ***user's task needs and contexts***

‣ many ways of doing this.

→ ***know your tools and choose effectively***

‣ evaluation techniques: tools in a toolkit

‣ each tool has strengths/weaknesses, and a cost to use

roadmap to evaluation types

pre-design

ethnography

observation

interviews, focus groups

questionnaires, surveys

early design

interviews, focus groups, observation

questionnaires, surveys

contextual inquiry & work modeling

task analysis, task / cognitive walkthroughs

participatory design

heuristic evaluation

mid-late design

observation, interviews, questionnaires, surveys
using advanced prototypes

heuristic evaluation

formal performance / usability testing

→ *evaluation material (prototype) evolves* →

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→ *evaluation material (prototype) evolves* →

Some techniques are ubiquitous…

‣interviews, observation, questionnaires:

  ‣ valuable throughout design process

‣BUT – they may be executed differently.

  ‣ early: for understanding

  ‣ later: for input on your design approach & details

‣what's the difference? what's the same?

Bowing to reality

‣what makes it hard to follow the "ideal" process?

  ‣deadlines

  ‣budget

  ‣access to appropriate users

  ‣involvement late in design cycle

  ‣valuation of HCI input by other parts of the organization

‣what do you do then?

Who are the stakeholders?

▸stakeholder = anyone who has some reason to care about the interface

    ▸can be lots of them!

    ▸needs may conflict

▸user: convenience, functionality, …

▸boss: price, worker efficiency

▸developer: ease of development - deadlines, budget

▸manufacturer: cost of production

▸advertiser: visibility

▸… more

How to figure out who your stakeholders are:

▸who will ask for it?

▸who will use it?

▸who will decide whether to use it
(or if someone else will use it?)

▸who will pay for it?

▸who has to make (design / build) it ?

▸who has to make a profit from it?

▸who will otherwise make your life miserable if they don't like it?

▸???

On deck…

Tuesday's class…

1. Readings (as posted)

2. Think about project ideas (real world problems around you)

3. Fill out the first day survey before the next class

Activity

get into groups of **4~5**, *introduce each other*

[10 min] Part 1. Brainstorm some real world problems around you:

- International students transitioning to the US
- Communication issues around the campus

[10 min] Part 2. Identify stakeholders

[10 min] Part 3. Explore some early solutions

Brainstorming rules

defer judgement, go for quantity, and be visual
(record ideas and gather similar ones together)