This lecture was originally prepared by Prof. Janet McDonnell, and edited/added to by Angela Sasse.

In Shneiderman & Plaisant, creative approaches to design are not covered, but there is a bit on scenarios on pages 127-129.
Goals of this lecture

1. Understand role of creativity in design
2. Identifying and vetting boundaries
3. Know some “methods” for creativity, and where to get inspiration
4. Scenarios
5. Link between creative and analytical
Creative Design Methods

- Creativity is ..
  - “often though of as an ability to think of alternatives…”

  - “A more profound notion of creativity is that of being able to change one’s view of things, and of oneself, to the point of attempting something you thought was impossible, beyond you. Creativity in design methods shows itself in the originality of ones questions, aims, classifications, processes, etc.”

  J.C.Jones, Design Methods, Wiley 1980, p.xviii
Design Boundaries

• Designers are concerned with problem setting and problems solving.
• How can this be when there are “functional requirements” to be satisfied?
  – Don’t confuse problem and solution
  – Don’t confuse primary functional needs with sub-problems arising from the perspective taken
  – Functional requirements may be negotiable

One way of establishing boundaries is the framework we have used many times before: user-system-task-context.

Our user needs study identifies requirements and constraints that each of those elements put on the solution; the design solution is bounded by the constraint, you find the solution within that space.

A frequently make mistake that leads to suboptimal and not innovative designs is accepting constraints that don't really apply to the design problem – more of that later.
Confusing problem and solution

Example: Brian Lawson describes being given a ‘design brief’ to design an extension to a family home.

- “The initial brief was rather vague … ideas of adding an extra bedroom or study … but house was already large enough for all the family to have their own bedrooms and there was a study … site was cramped… valuable garden space would be lost … considerable expense …”
- “At one meeting ideas of being able to accommodate grandparents were discussed to the sounds of very loud music from one of the teenager’s bedrooms … it gradually emerged that the house was big enough … it needed dividing up better acoustically …”
- “The actual solution was initially suggested as a joke … buy the teenagers some headphones.”
Key point is never to take your eye off the goal of the design – getting the cars through the tunnel. If you start with a sub-goal – assuming cars have to be driven through the tunnel – you limit yourself to solutions to that sub-goal. Devising solutions to sub-goals leads easily leads to sub-optimal solutions (inefficient, unnecessarily complex, and at worst ineffective).
(Even) functional requirements may be negotiable …

Utzon’s design for the Sydney Opera House

.. won the competition despite NOT meeting the stated requirement for numbers of seats in the principal auditorium.
Creative Design Methods for DIVERGENCE: expanding the problem boundaries

A selection of methods for individuals or teams:
1. Why? Why? Why?: Ask a string of questions (like a tiresome toddler) until the thread runs out.
2. Using a Dialectic: Take an idea (thesis), imagine the opposite (antithesis), generate a new idea from compromise (synthesis).
3. Random/Chance: Open a book, select a word from a dictionary, select a picture, etc - at random and use what is found to stimulate ideas about the problem.
4. Transformation (many variations): Look up a term in a thesaurus and consider the words associated with it.

Transformation
An example from J.C.Jones:
How to drain water from a pavement after rain -> (inadequate solution) let the puddles evaporate -> terms associated with evaporate in a thesaurus -> vanish, fade, sink, fly away, die away, melt away, dissolve, disappear, etc.
sink ? what about perforated paving?
fly away? suck the water from the pavement with something?
dissolve? use porous paving?
more on DIVERGENCE

The most well known method for teams:

- **Brainstorming**: increase number and diversity of ideas
cross-stimulation of ideas between team

- **Procedure & Rules**
  - any statement is ok
  - no criticism or evaluation initially (chairperson enforces this)
  - each idea noted briefly - elaboration only to support this

- **evaluation**
  - ideas immediately useful
  - areas for further exploration: e.g. functional aspects of a ‘silly’ idea
  - new approaches to the problem
Creating Design Team Visions

• seeking inspiration from other disciplines

  – Theatre
    • role playing, getting different perspectives on the problem
    • scenario enactment

  – Visual Images
    • escape from verbal constraints
    • using metaphors creatively
The IDEO Innovation Process

1. Understand
   - Market, client and technology – later maybe challenge constraints
2. Observe
   - Real people in real situations – what latent needs do they have
3. Visualize
   - New concepts and customers - using brainstorming, prototypes, storyboards, make a video
4. Evaluate and refine
   - Quick iterations of prototypes, test and challenge, plan series of improvements
5. Implement
   - Longest phase – commercialisation of new concept

IDEO is a global design company – see www.ideo.com/
IDEO on understanding and observing

• Don’t ask people what they think about an idea!
  – Too polite, observing protocol, politics
    “Fine is a four-letter word”
  – Cannot articulate, lack vocabulary, diagnosis of a problem is not the same as knowing a cure
  – Not the customers’ job to be visionary
• IDEO solution -
  – “Innovation begins with an eye” (Leon Segal)
Metaphorical Design

“*The primary function of metaphor is to provide a partial understanding of one kind of experience in terms of another kind of experience. This may involve pre-existing isolated similarities, the creation of new similarities, and more.*”

G.Lakoff & M.Johnson, Metaphors We Live By, p. 154

- In the context of using metaphor to encourage new ideas metaphor is used simply as a linguistic tool to open up the imagination - to see the work situation in new ways.
- Also: starting point for Design Model → see Conceptual Design
Metaphors we live by - an example

- MIND IS A MACHINE
  - We're still trying to grind out the solution to this equation.
  - My mind just isn't operating today.
  - I'm a little rusty today.
  - We've been working on this problem all day and now we're running out of steam.

- MIND IS A BRITTLE OBJECT
  - Her ego is very fragile.
  - You have to handle him with care since his wife died.
  - He broke under cross-examination.
  - She is easily crushed.
  - The experience shattered him.
  - I'm going to pieces.
  - His mind snapped.

Lakoff & Johnson pp.27,28
Metaphorical Design
- e.g. In Future Workshop

- Ideas may come up during a future workshop - in brainstorming for example - that the facilitator can exploit.
- Participants are encouraged to explore the correspondences and differences between a situation and a metaphor.

- Kensing & Halskov Madsen give the example
- "all we do is inventory control" to invite comparison of libraries with warehouses leading - through differences - to a comparison of libraries with shops.
Generating Visions

- Is central to participatory design – designing systems through the co-operation of designers and users

  “Both artists and scientists operate on the physical world as it exists in the present … Designers on the other hand, are forever bound to treat as real that which exists only in an imagined future and have to specify ways in which the foreseen thing can be made to exist.”
  J.C. Jones, Design Methods, p.11

- Is used in shifting focus
  - from users doing their current work
  - to helping them to develop ideas about future ways of working

- Takes place during
  - future workshops
  - metaphorical design exercises

Participatory design → see lecture User Involvement in Design
Scenarios as tools for visions

- Story of how users will interact with system
  - Day in the (future) life of ...(see example Scenario)
- Write scenarios
  - On storyboard: for walkthrough, checking
  - Act out: in participatory design workshop – particularly effective to get groups of users to discuss varying requirements and identify concerns
  - Produce video (e.g. Steve Masters)
  - Danger: scenarios instead of requirements capture
    - Must be validated

Participatory design workshop: see Lecture User Involvement
Summary points

1. Deep understanding of the problem and ruthless examination of constraints are essential to define boundaries of design problem.
2. Design solution is derived within those boundaries.
3. Creative approaches help to find solution within design space.
4. Inspiration is good for creativity, but
5. … there are systematic ways of getting inspiration.
6. Derive several solutions and compare how well they fit requirements, and how users respond to them.

J.C.Jones, Design Methods, Wiley 1980.
G.Lakoff & M.Johnson, Metaphors We Live By, University of Chicago Press, 1980.