



DESIGN THINKING

ITX 2005 WEEK 3 – LEARNING TO UNDERSTAND

Edward Burtynsky
Coal Mine #1, North Rhine, Westphalia, Germany, 2015

AGENDA

EMPATHISE II	HCD	GOOD/BAD DESIGN	DISCOVERABILITIES	COMPLEXITY
<ul style="list-style-type: none">• Understand	<ul style="list-style-type: none">• Human-Centred Design• Human Body• Human Behaviours	<ul style="list-style-type: none">• Good Design Principles• Intentional Difficulties	<ul style="list-style-type: none">• Discoverabilities• Affordance• Signifier• Mapping• Feedback• Constraint	<ul style="list-style-type: none">• Complexity vs Complication• Simplicity Paradox• Featuritis

----- BREAK -----

EXERCISES

- The Ideal Wallet (Continuation from WK2)

Before We Begin

SIDENOTES

*Remember these
photographs?*



Edward Burtynsky
Shipbreaking #4, Chittagong, Bangladesh, 2001

SIDENOTES

Remember these photographs?



Edward Burtynsky
Makoko #2, Lagos, Nigeria, 2010

SIDENOTES

Edward Burtynsky





Edward Burtynsky
Nickel Tailings, #34, Sudbury, Ontario, Canada, 1996



Edward Burtynsky
Oil Fields #2, Belridge, California, USA, 2003



Edward Burtynsky
Dyralaekir River on Myrdalssandur, Iceland, 2012



Edward Burtynsky
Log Booms #1, Vancouver Island, British Columbia, Canada, 2016



Edward Burtynsky
Xiaolangdi Dam #1, Yellow River, Henan Province, China, 2011



Edward Burtynsky
Oil Fields #2, Belridge, California, USA, 2003



Edward Burtynsky
Manufacturing 10A/B, Cankun factory, Xiamen, China, 2005



Edward Burtynsky
Manufacturing #17, China, 2005

Back to our Class!

1. EMPATHISE II

- Understand
- Asking Questions
- Observation

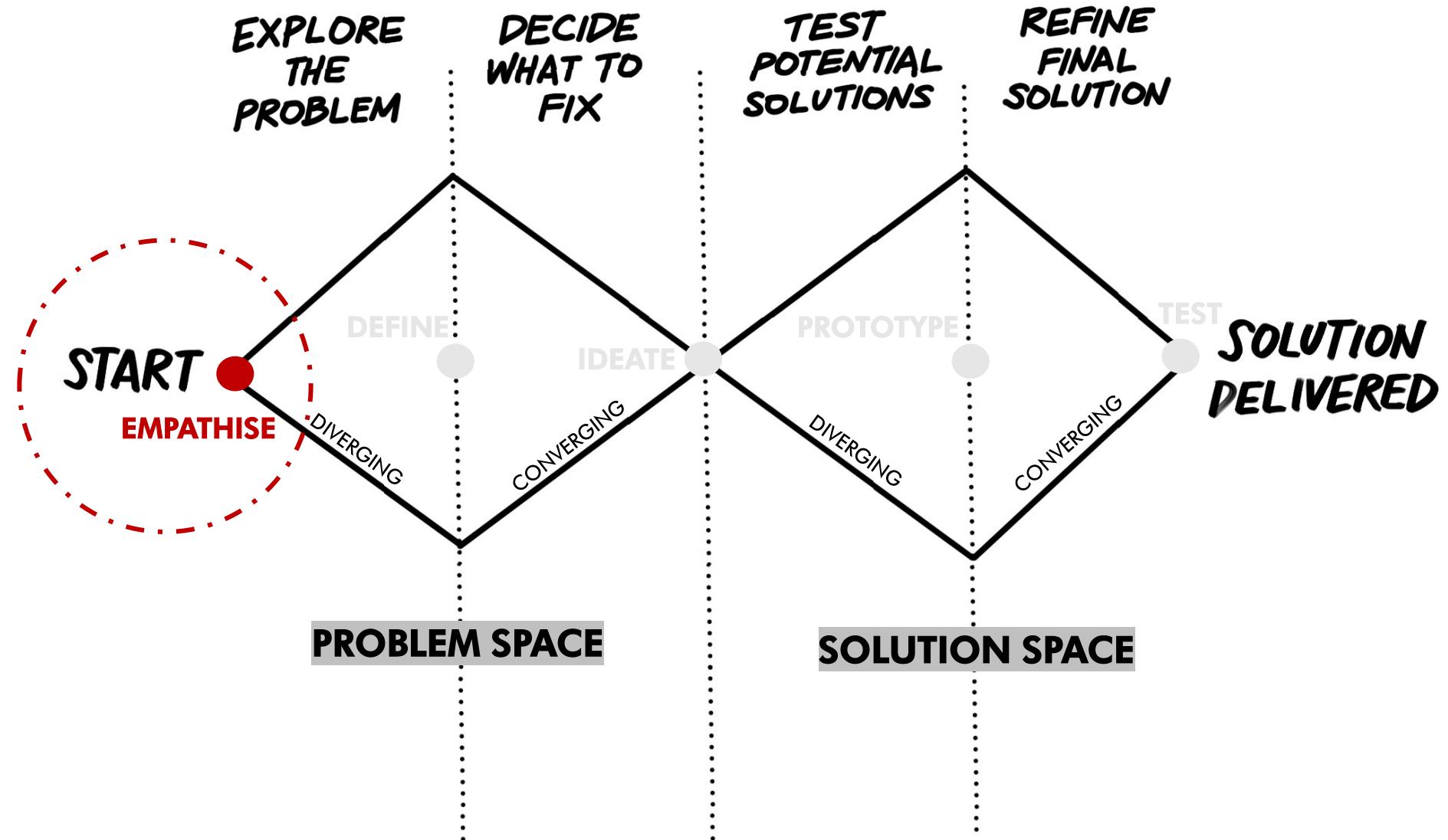


Edward Burtynsky
Bao Steel #8, Shanghai, China, 2005

DESIGN THINKING

Design Thinking *Process*

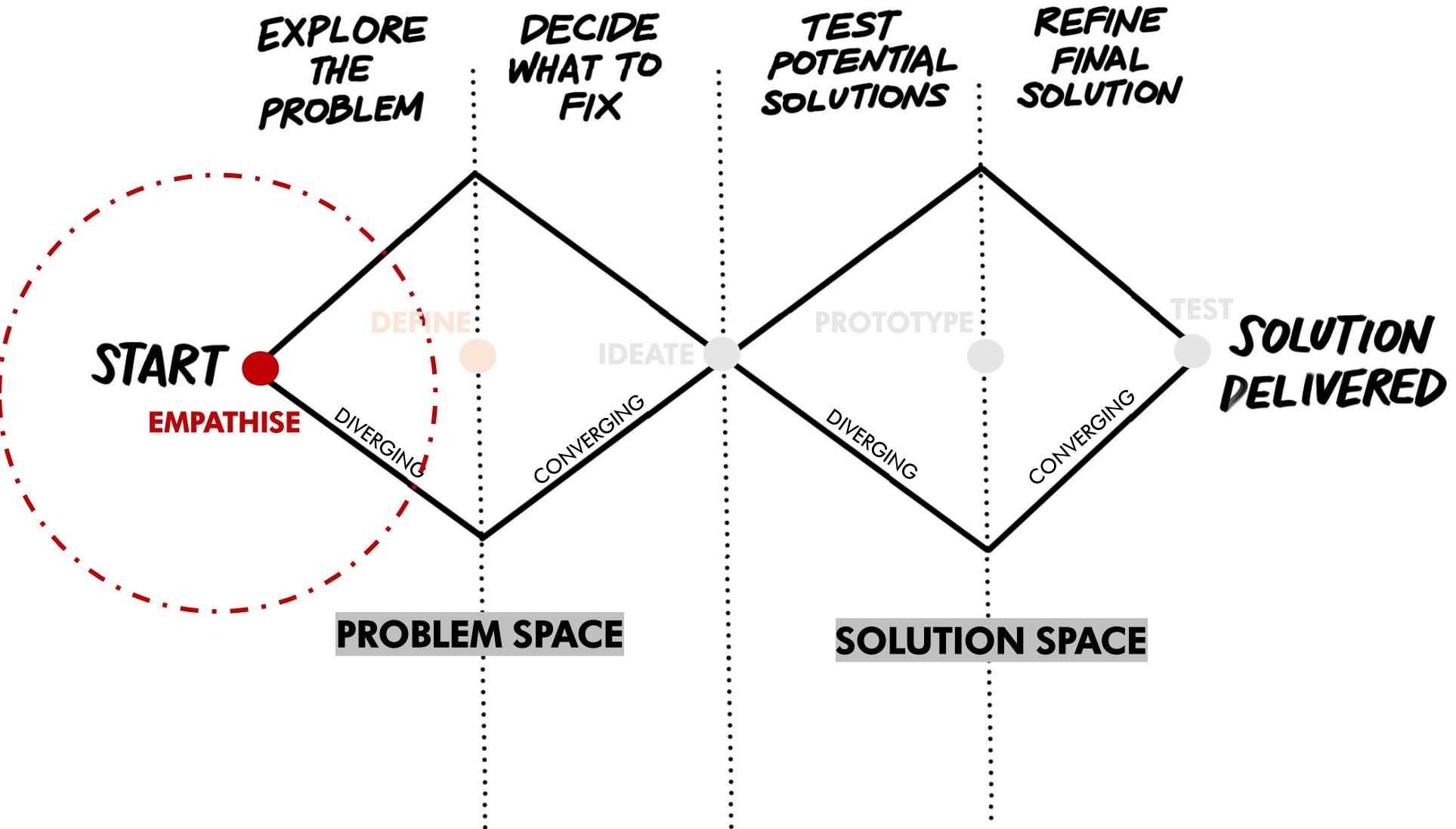
1. Empathise
2. Define
3. Ideate
4. Prototype
5. Test



DESIGN THINKING

Design Thinking *Process*

1. Empathise
2. Define
3. Ideate
4. Prototype
5. Test



EMPATHISE

Initial stage to solve any problem

- **Base** / Fundamental
- **Critical** to the overall process



The Integral House under construction, Edward Burtynsky, 2021

DEFINITIONS

Empathy (noun) /'empəTHē/ (Oxford)

the ability to **understand** another person's feelings, experience, etc.

Empathise (verb) /'empə,THīz/ (Oxford)

To **understand** and share the feelings of another.

EMPATHISE

Empathise

- Observe
- Understand



Jewish Museum, Berlin, 1999

EMPATHISE

Understand?

EMPATHISE

Understanding
design

=

Understanding the
world around us



Juicy Salif, Philippe Starck, 1990



Apps



MahaNakorn, Büro Ole Scheeren, Bangkok, 2018

EMPATHISE

Understanding
design

=

Understanding the
world around us



EMPATHISE

Design = Problem Solving

EMPATHISE

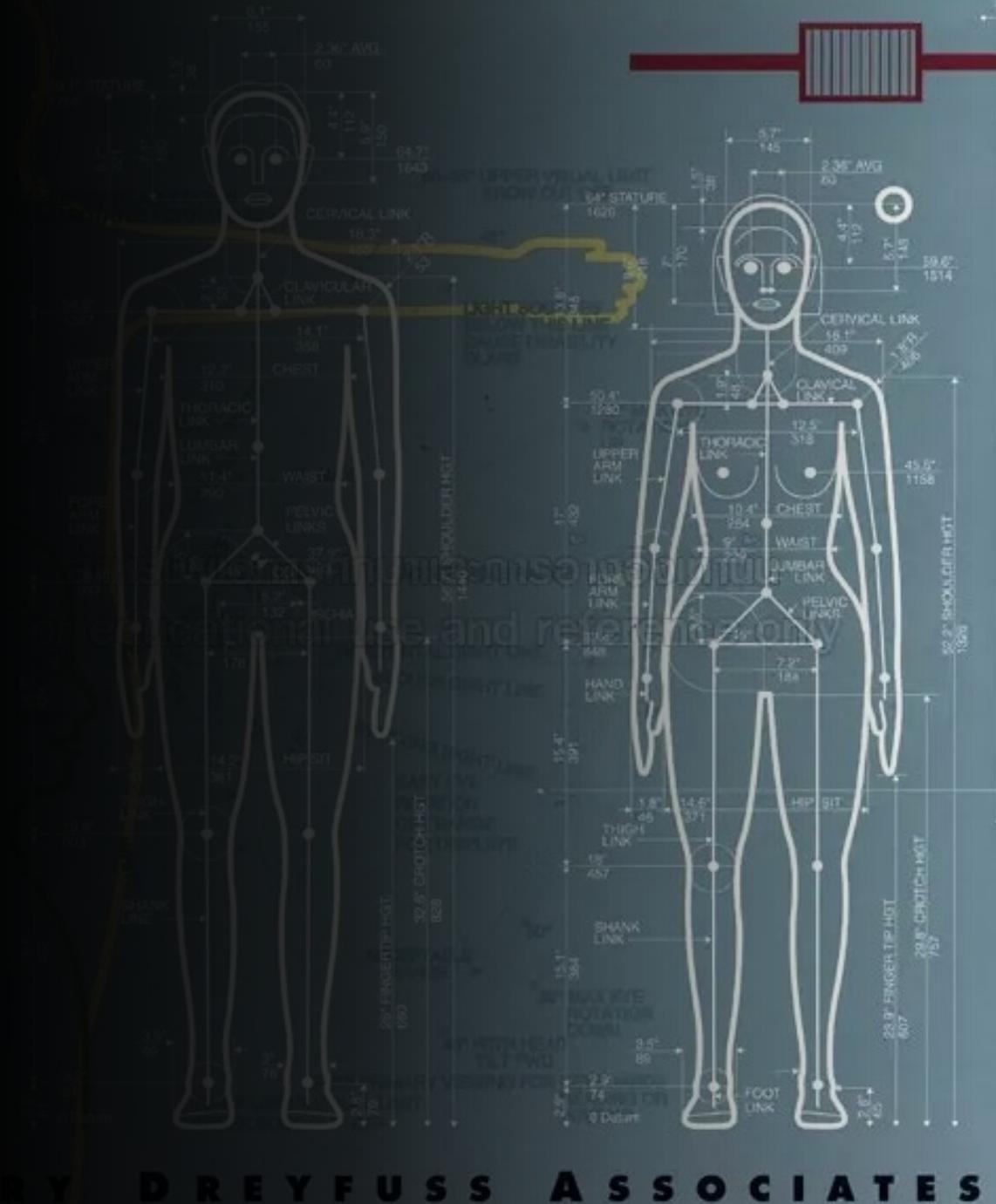
Design = Problem Solving

EMPATHISE

Design = Problem Solving
People / Processes

HUMAN-CENTRED DESIGN (HCD)

- Human Body
- Human Behaviours



THE
MEASURE OF
MAN & WOMAN
REVISED EDITION

HUMAN
FACTORS
IN
DESIGN

More than 200 anthropometric diagrams
fully detailing "the measure of man and
woman" from childhood to old age

Covers the needs of the differently abled in
accordance with the Americans with
Disabilities Act

Human factors data on temperature, noise,
radiation, lighting, and other environmental
conditions

Includes ErgoForms demo disk with CAD-
ready sample figures

D R E Y F U S S A S S O C I A T E S

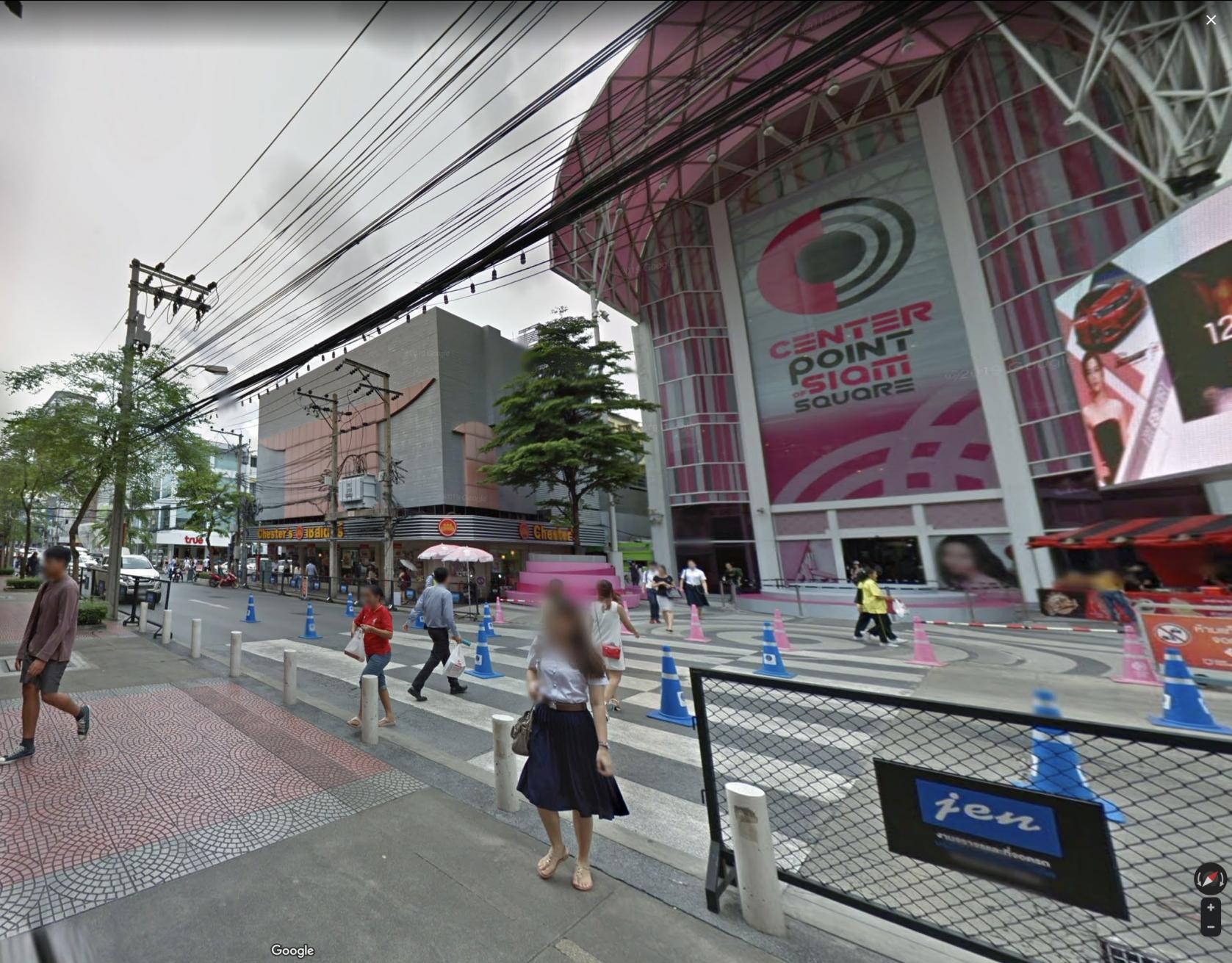
HUMAN-CENTRED DESIGN

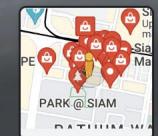
*What is **Human-Centred Design**?*

HUMAN-CENTRED DESIGN

*Example of **Human-Centric** Design*















9

AROEN



EXIT
ทางออกปีก 22.00 ม.
โปรดใช้ทางออกช่อง 6
หรือออกแนวรั้วบึงต์
Exit to Side 6 or from Diorant Rd. Closed 10.00 pm









REPORTERS

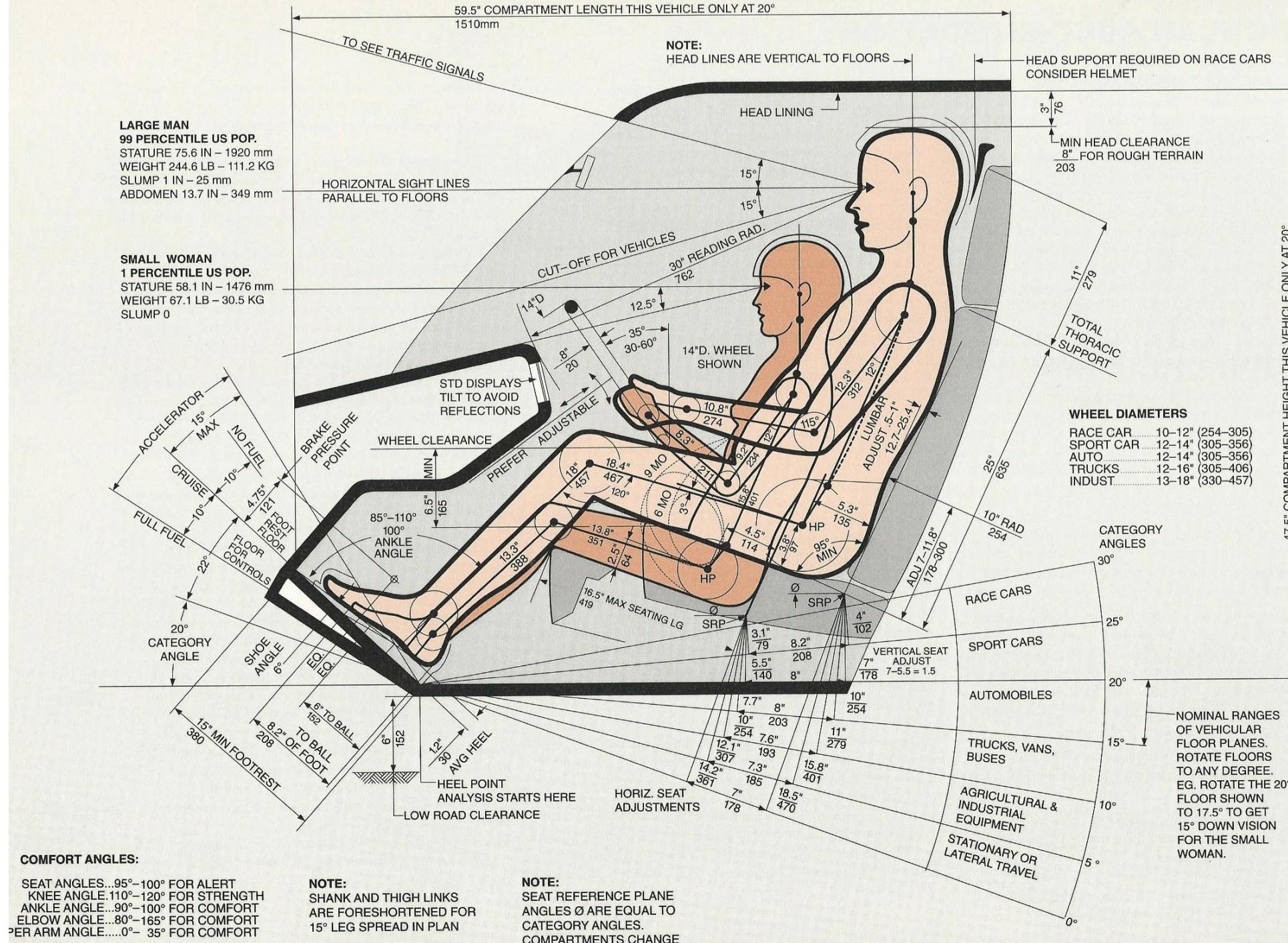


REPORTERS

HUMAN-CENTRED DESIGN

Human-Centred Design

Design philosophy/approach which accounts for **the human perspectives/emotions** in all of the steps/processes.



HUMAN-CENTRED DESIGN

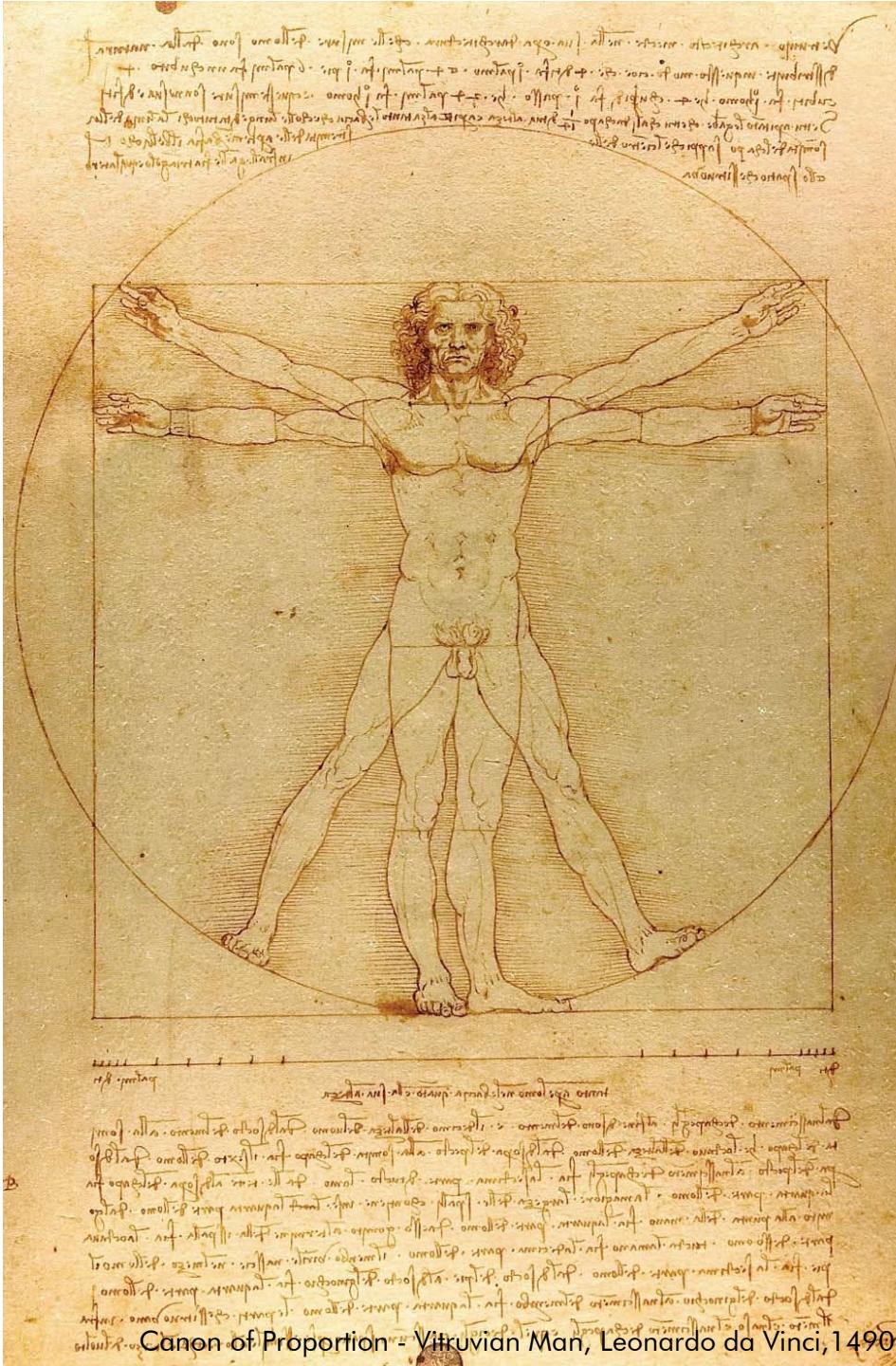
**Things are design for
us!**



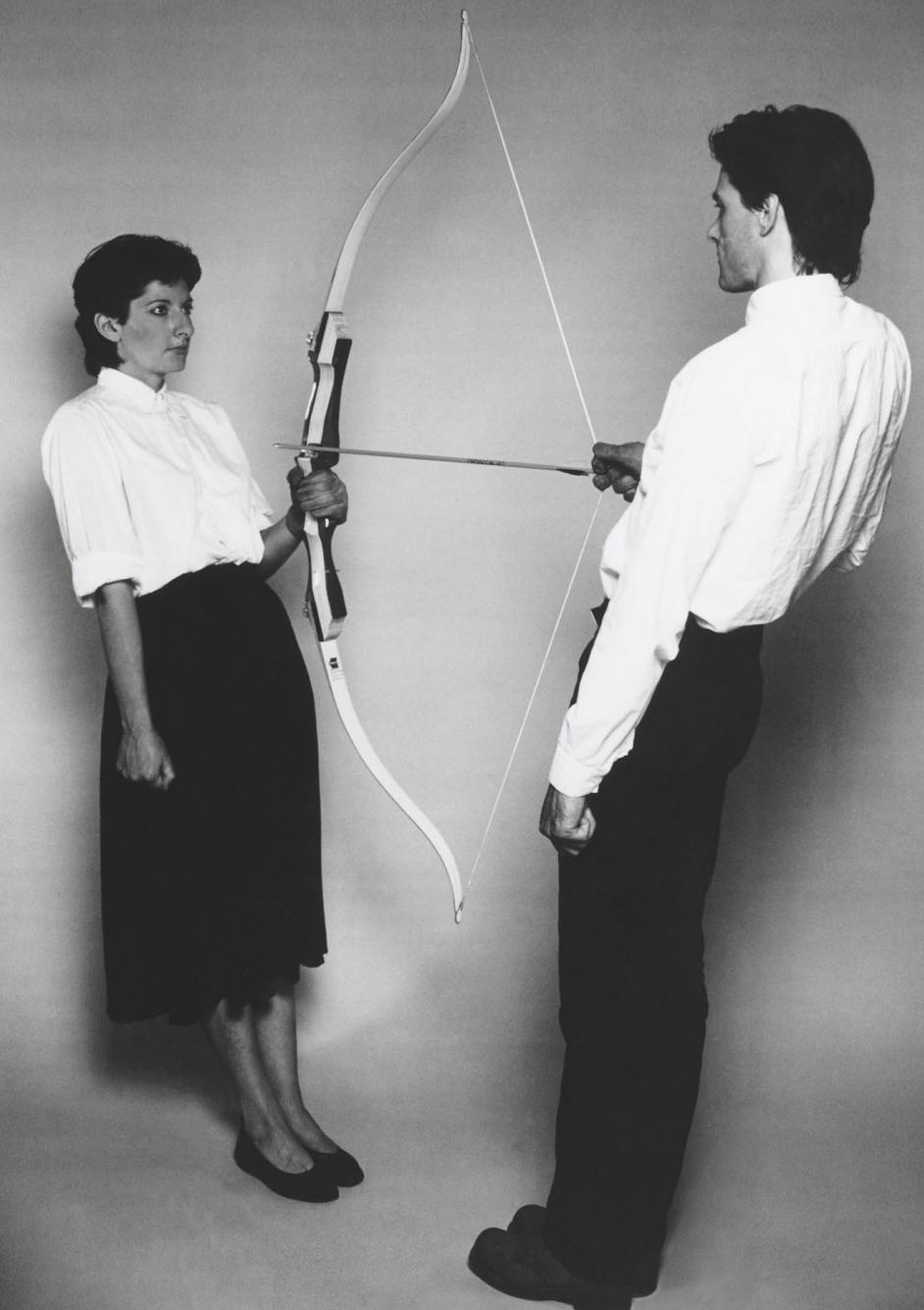
Mobiliario Humano, David Blazquez, 2009

HUMAN-CENTRED DESIGN

- Human Body
- Human Behaviours



Canon of Proportion - Vitruvian Man, Leonardo da Vinci, 1490

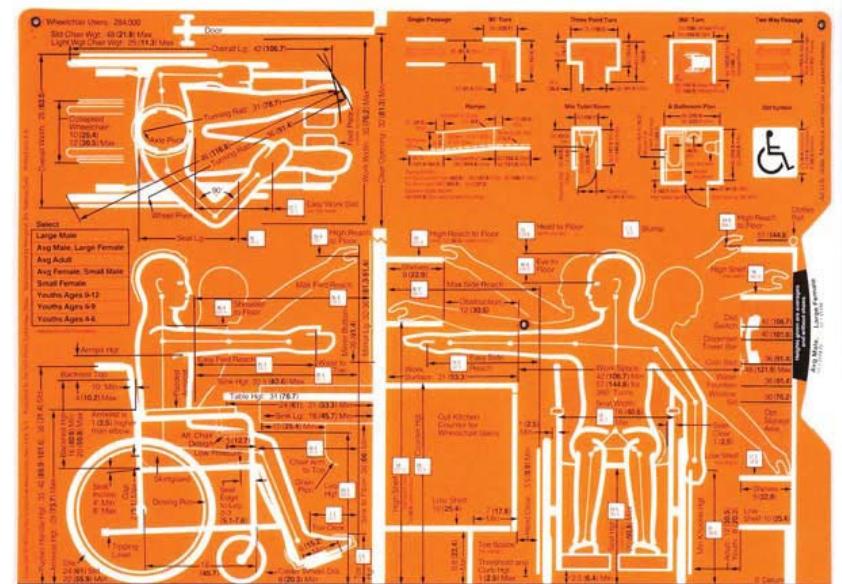
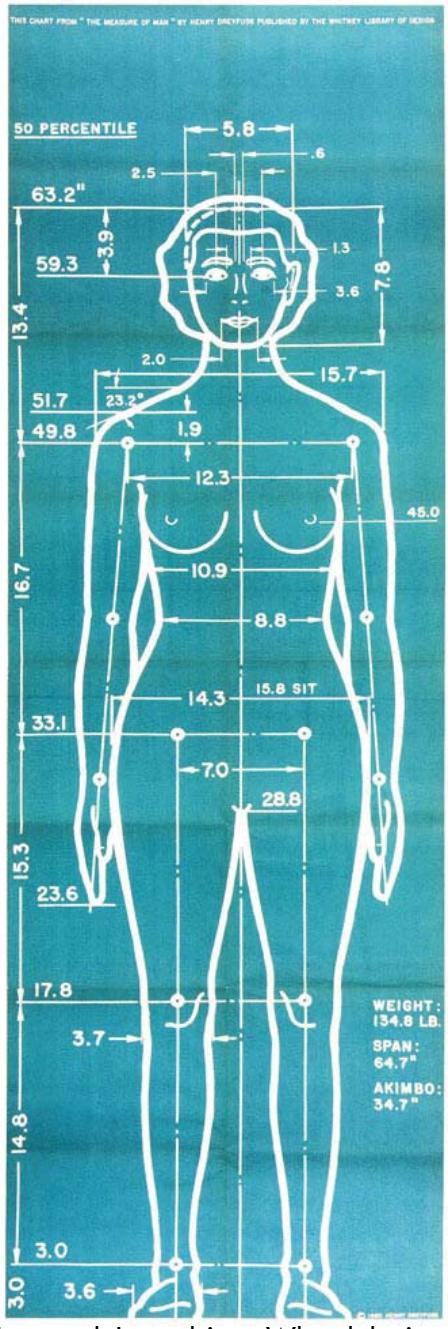
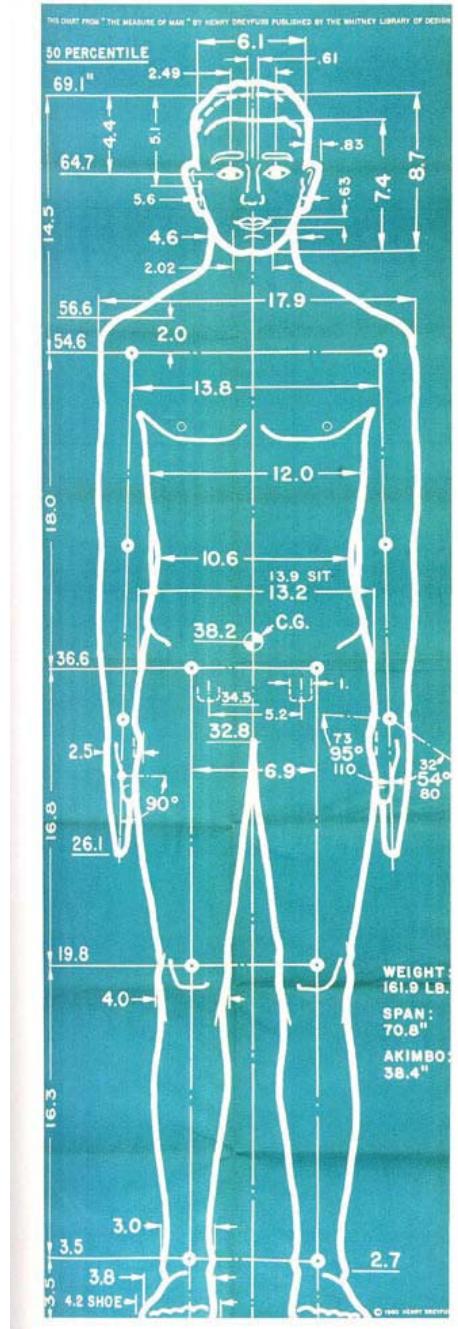


Rest Energy, Marina Abramović and Ulay, 1980

HUMAN BODY

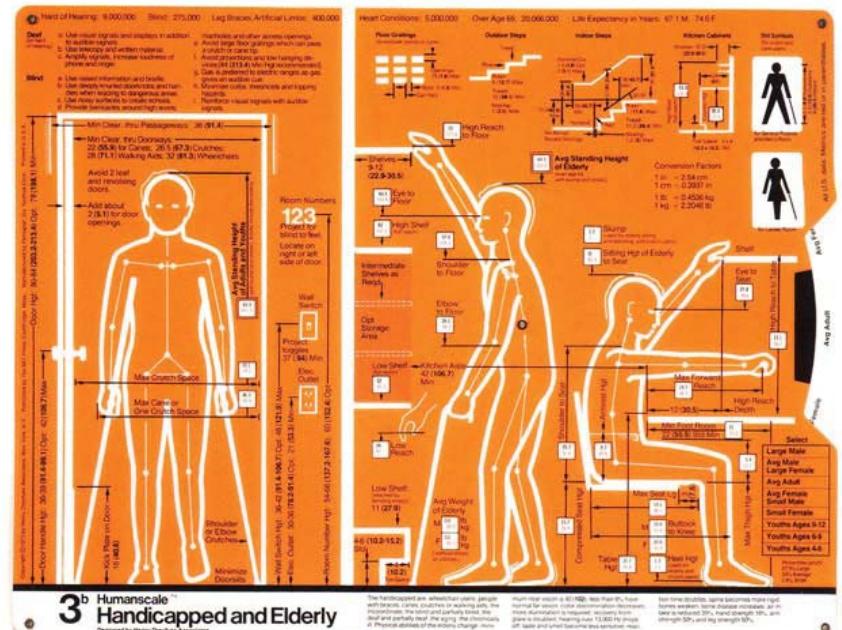
The Physical Body

The built environment is made for the human body



3a Humanscale
Wheelchair Users

Designed by Henry Dreyfuss Associates



3b Humanscale
Handicapped and Elderly

Designed by Henry Dreyfuss Associates

HUMAN BODY

The Physical Body

The built environment is made
for the human body



Modern office space

HUMAN BODY

Human Anatomy

- Understanding the functions of the organs and structures of the human body



MUSCLES—PLATE I.

Names of the muscles as numbered and represented in the plate, according to their uses and functions.

- 1 Tense of the forehead, when the occipital muscular planes contract; perpendicular wrinkles of the skin of the face heat, when the anterior muscular planes contract.

2 Adductor of the eyebrows, and transverse wrinkle of the forehead.

3 Depression of the skin of the forehead.

4 Constrictor of the eyelids.

5 Common elevator of the upper lip and wings of the nose.

6 Proper elevator of the upper lip.

7 Elevator of the corners of the lips.

8 Lateral elevator of the corners of the lips.

9 Drawing up the commissure of the lips, which it draws backwards and extends the commissures.

10 Recructor of the lips, or sphincter of the mouth.

11 Depressor of the angle of the lips.

12 Depressor of the lower lip.

13 Depressor of the skin of the chin and lower lip.

14 Lowering of the angle of the lower lip, and corrugator of the skin of the mouth.

15 Elevator of the lower jaw, or mandibular.

16 Elevator of the angle of the lower jaw.

17 Elevator of the os hyoides and elevator of the thyroid cartilage.

18 Depression of the thyroid cartilage.

19 Depressor of the os hyoides.

20 Depressor of the processus xiphoides of the hyoidies.

21 Lateral depressor of the neck, and elevat. of the first two vertebrae.

22 Depressor and rotator of the head forwards.

23 Great ante. pectoral—adducts the arm and dilates the thorax, (a muscle of inspiration and motion.)

24 Pectoral—adducts the arm of the shoulder, and elevat. of the first five ribs, (a muscle of inspiration.)

25 Elevator of the first rib, and pro-mot. of the clavicle, (a muscle of inspiration.)

26 Pro-mot. of the scapula, and approximatis the ribs at each other, (a muscle of inspiration.)

27 Approximatis the ribs to each other and dilates the thorax, (a muscle of inspiration.)

28 Extensor of the arm, and elevat. of the scapula, post-mot. of the head and neck towards the centre, and elevat. of the head and neck towards the centre, and elevat. of the head and neck towards the centre, antero or po. posterior, according as its fibres, ante or po. posterior, at.

29 Extends the fore-arm on the arm, or the arm on the fore-arm, and adducts the scapula.

30 Flexor of the forearm on the arm, or of the arm on the forearm, and rotates the arm slightly; elevates the arm slightly, and lowers the shoulder.

31 Adductor and pro-mot. of the arm.

32 Flexor of the fore-arm on the arm, or of the arm on the fore-arm.

33 Separative or mot. of the fore-arm outwards, and slightly flexes the fore-arm on the arm.

34 Flexor of the fore-arm on the arm, or of the arm on the fore-arm.

35 Extensor of the hand, which it bends towards the radius.

36 Flexor of the second phalanges of the fingers.

37 Corrugator extensor of the fingers.

38 Flexor of the hand, and bends it towards the ulna.

39 Tensor of the palmar aponeurosis.

40 Flexor of the hand towards the radius.

41 Pronator or rotator of the fore-arm inwards.

42 Extensor of the hand, which it bends towards the radius.

43 Flexor of the second phalanges of the fingers.

44 Adducts the hand towards the radius.

45 First flexor—bends the thumb towards the palm.

46 Second flexor—rests the thumb towards the palm.

47 Opponens palmar muscle—puckles the fingers.

48 Flexor hypothenar—bends the little finger towards the ulna.

49 Flexor of the thorax on the pelvis, which it bends to its own side, and rotates of the trunk forwards, (muscle of expiration.)

50 Tensor of the pre-lumbar aponeurosis, or lateral conpressor of the viscera, (muscle of exhal. con.)

51 Depressor of the larynx and compresses the viscera, (muscle of exhalation.)

52 Compresses, lowers, and extends the linea alta, (muscle of exhalation.)

53 Post-mot. adductor, and depressor of the arm, which it bends towards the head.

54 Extensor of the leg and flexor of the thigh.

55 Extensor of the leg.

56 Flexor of the leg and thigh on the pelvis, rotates the thigh and powerfully adducts the leg.

57 Adductor, flexor and rotator later. of the thigh.

58 Extensor of the leg.

59 Abductor and tensor of the spongioblast, called fascia lata.

60 Commiss extensor of the toes and flexor of the foot.

61 Extends the fit. and elevates its outer edge.

62 Extensor of the foot and flexor of the leg.

63 Extensor of the fit. and flexor of the leg.

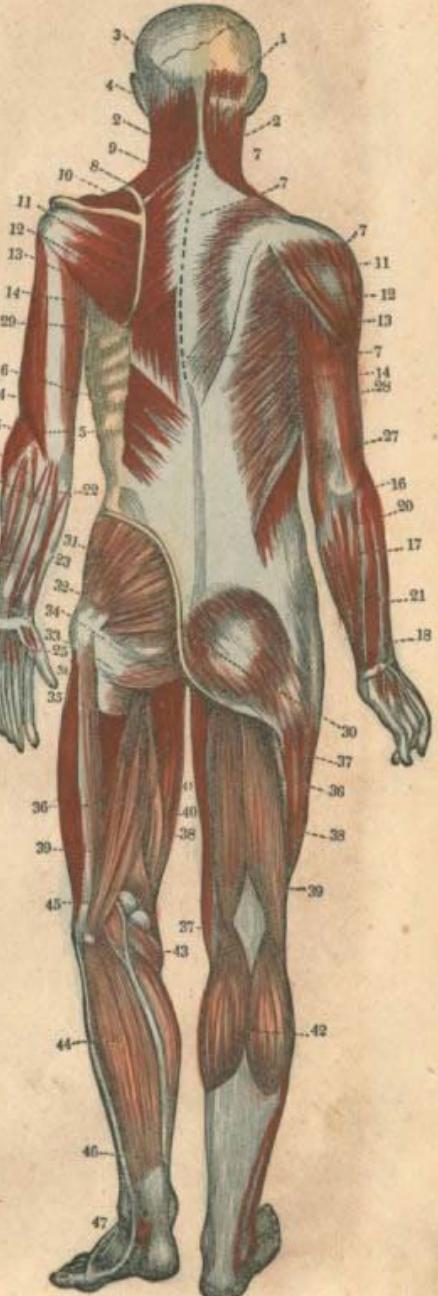
64 Extensor of the foot.

65 Extends the great toe and flexes the foot.

MUSCLES—PLATE II.

Names of the muscles as numbered and represented in the plate, according to their uses and functions.

- 1 Tense of the forehead, when the occipital muscular planes contract; perpendicular wrinkles of the skin of the head, whilst the anterior muscular planes contract.
 - 2 Depressor and rotator of the head forward.
 - 3 Great pectoral tense muscle of the neck—inclines the head backwards and slightly rotates it.
 - 4 Serratus—extends the head, or inclines it backwards and a little to the right.
 - 5 Lowers the head and flexes (muscle of pectoration.)
 - 6 Approximates the ribs to each other and dilates the thorax, (muscle of inspiration.)
 - 7 Postator of the head, elevator and adductor of the scapula, elevator of the trunk towards the shoulders.
 - 8 Adductor of the scapula towards the vertebral column and rotates it inwards.
 - 9 Elevator and adductor of the scapula, post-motor of the head and neck, towards the scapula.
 - 10 Elevator and post-motor of the head of the humerus, abductor of the scapula.
 - 11 Flexor-motor and rotator of the arm towards the scapula, which it abducts.
 - 12 Flexor of the forearm, and rotator of the head of the humerus, and abductor of the scapula.
 - 13 Adductor, depressor and post-motor of the arm, which it rotates inwards; abductor and elevator of the scapula.
 - 14 Extends the fore-arm on the arm, or the arm on the fore-arm, and abducts the scapula.
 - 15 Supinator or post-motor of the fore-arm outwards, and slightly rotates the fore-arm on the arm.
 - 16 Extensor of the head, which it inclines towards the radius.
 - 17 Common extensor of the fingers.
 - 18 Proper ex extensor of the little finger.
 - 19 Extensor of the hand, which it inclines towards the ulna.
 - 20 Extensor and supinator of the forearm.
 - 21 Flexor of the hand, and tends to rotate the ulna.
 - 22 Flexor of the second phalanx of the thumb.
 - 23 Flexor of the third phalanx of the thumb.
 - 24 First thoraco—bends the thumb towards the radius.
 - 25 Second thoraco—rotates the thumb towards the palm.
 - 26 Flexor in pochette—bends the little finger towards the ulna.
 - 27 Flexor of th. thorac. on the pelvis, which it bends to its own side, and rotates of the trunk backwards, (muscle of extension.)
 - 28 Intrinsic extensor, abductor, and depressor of the arm, which it turns inwards.
 - 29 Long muscle of the vertebral—straightens the trunk and bends the thorax backwards towards the pelvis.
 - 30 Extensor or post-motor of the thigh, which it rotates outwards.
 - 31 Abductor, and slightly a rotator of the thigh outwards.
 - 32 Extensor of the knee.
 - 33 Rotator of the thigh outwards.
 - 34 The same.
 - 35 The same.
 - 36 Extensor of the leg.
 - 37 Rotator and rotator of the thigh inwards, and flexor of the leg.
 - 38 The same.
 - 39 Post-motor of the thigh, flexor and rotator of the leg outwards.
 - 40 Fixes and adducts the leg.
 - 41 Adductor of the thigh.
 - 42 Extensor of the foot and flexor of the leg.
 - 43 Flexes the leg and rotates it inwards.
 - 44 Extensor of the foot.
 - 45 Extends the foot and flexes of the leg.
 - 46 Extends the foot and raises its outer edge.
 - 47 Flexor of the foot, which it inclines forwards.



HUMAN BODY

Human Anatomy

- Understanding the functions of the organs and structures of the human body



Anatomy for the Blind, 1913

HUMAN BODY

Human Anatomy

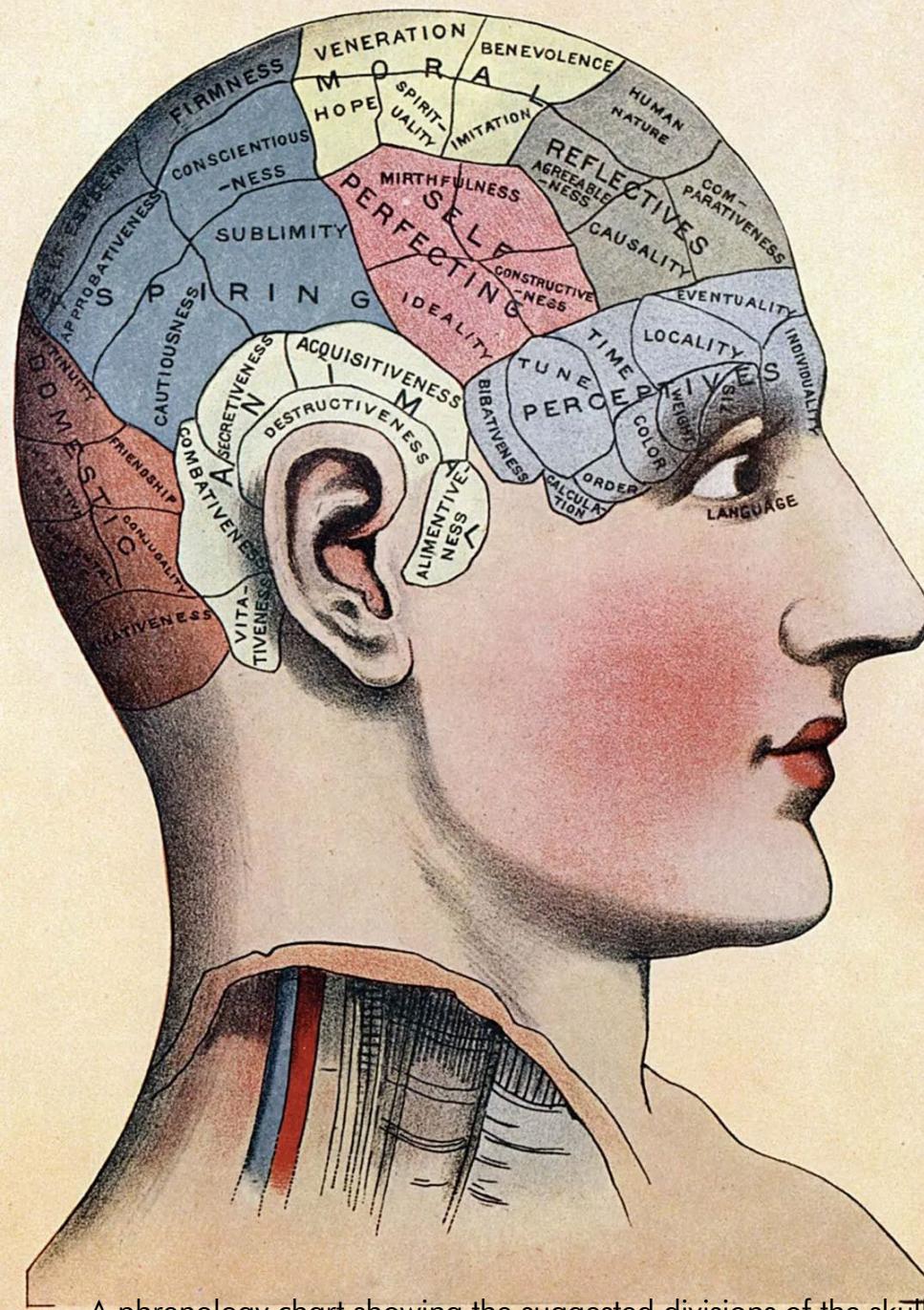
- Understanding the functions of the organs and structures of the human body



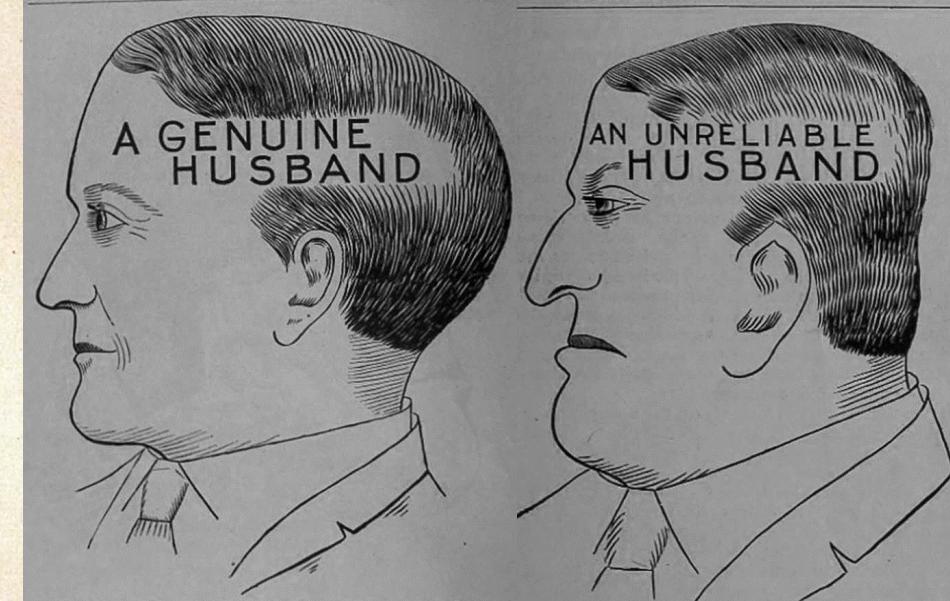
HUMAN BODY

Phrenology

- Pseudo-science primarily focused on measurements of the human skull
- Based on the concept that the brain is the organ of the mind, and that certain brain areas have localized, specific functions or modules



A phrenology chart showing the suggested divisions of the skull



Young ladies, indelibly fix this shape of head in your memories. Any man who will make a natural, kind and true husband will have a head in outline from ~~as~~ he is very weak in Conjugality and Parental Love and exceedingly strong in Amativeness. Young lad

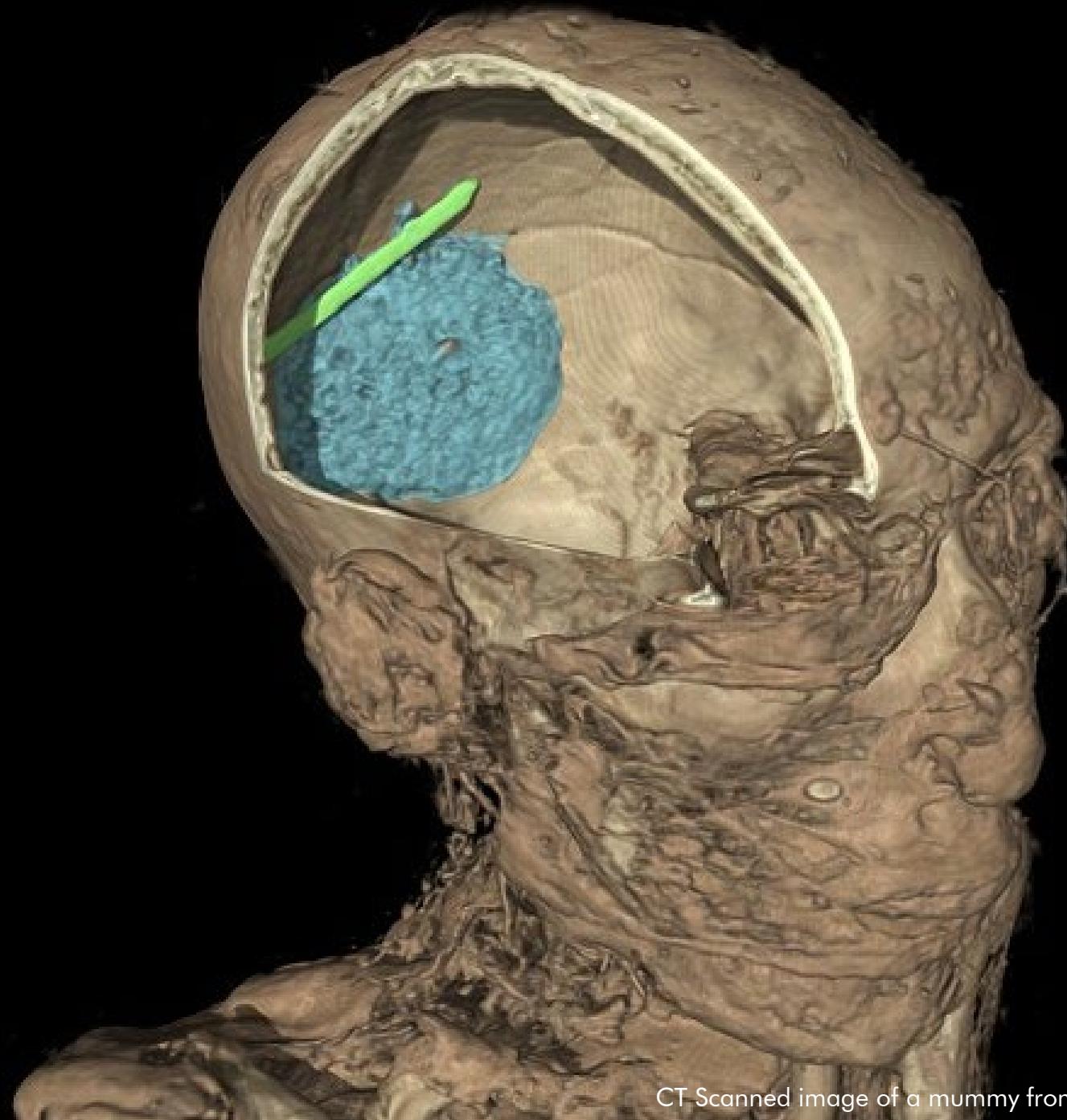
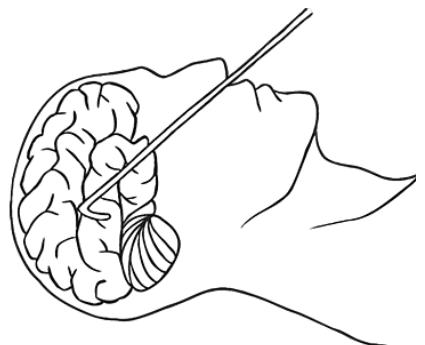


Phrenology Booth | 1900s

HUMAN BODY

Misconception

- 'Excerebration'



CT Scanned image of a mummy from British Museum

HUMAN BODY

Neuroscience

- Study of the nervous system



HUMAN BODY

Neuroscience

- Study of the nervous system

DOPAMINE SEROTONIN & TIME PERCEPTION NICOTINE: USES & QUITTING

HUBERMAN LAB

HUBERMAN LAB

OPTIMIZE WORK & HEALTH INCREASE YOUR FOCUS

HUBERMAN LAB

HUBERMAN LAB

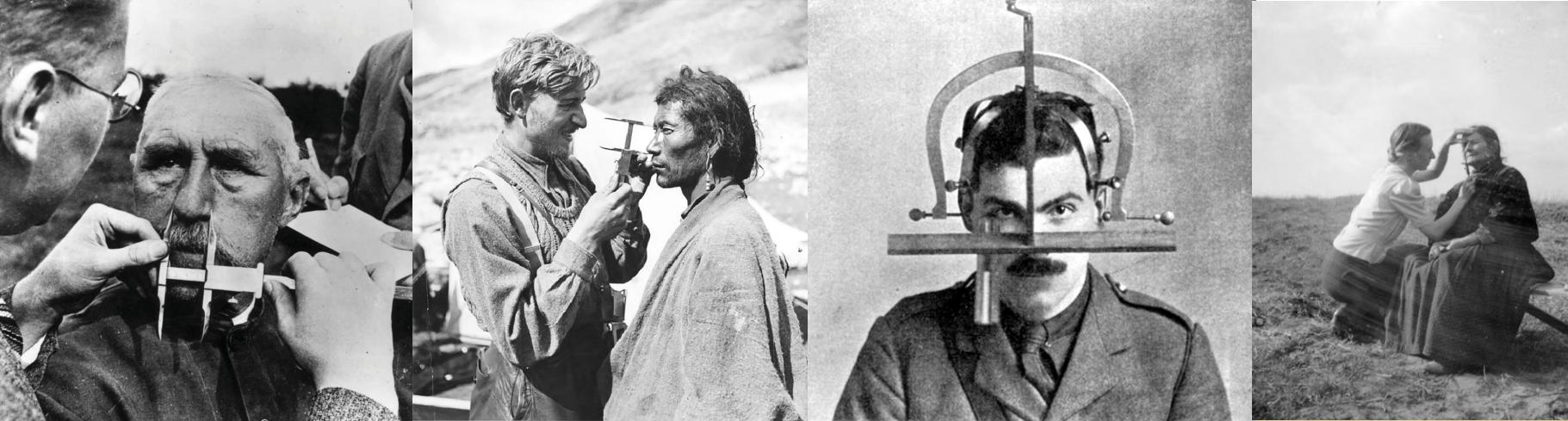


Andrew Huberman Podcasts

HUMAN BODY

Anthropometry

- Anthropometry refers to the measurement of the human individual
- It has been used for identification, for the purposes of understanding human physical variation.



An early set of finger- and handprints by Sir William Herschel, 2nd Baronet (1833–1917)

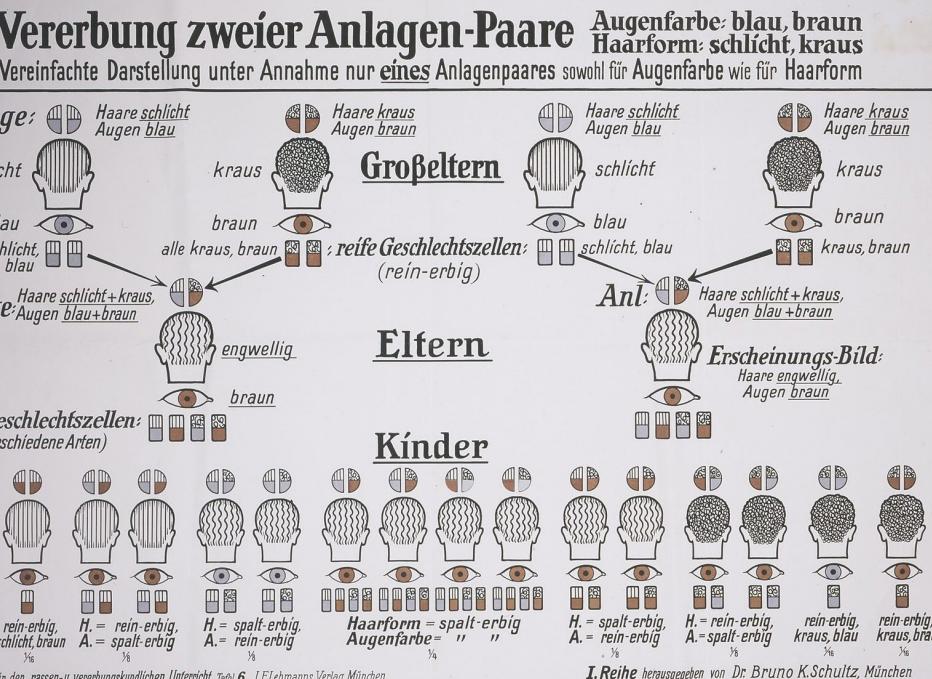
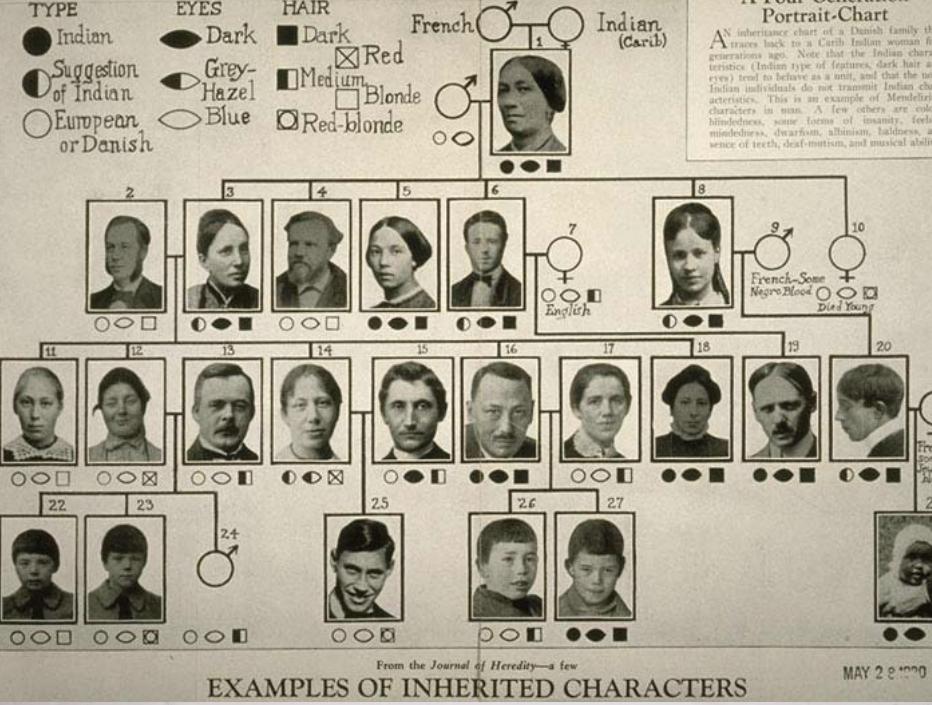
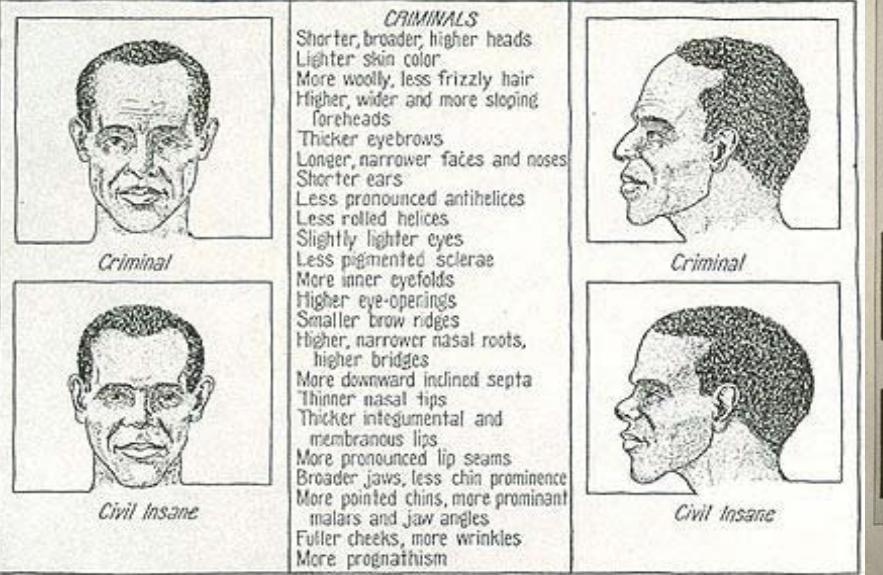
HUMAN BODY

Eugenics

- The dark side of Anthropometry
 - The belief and practice of improving the genetic quality of the human population



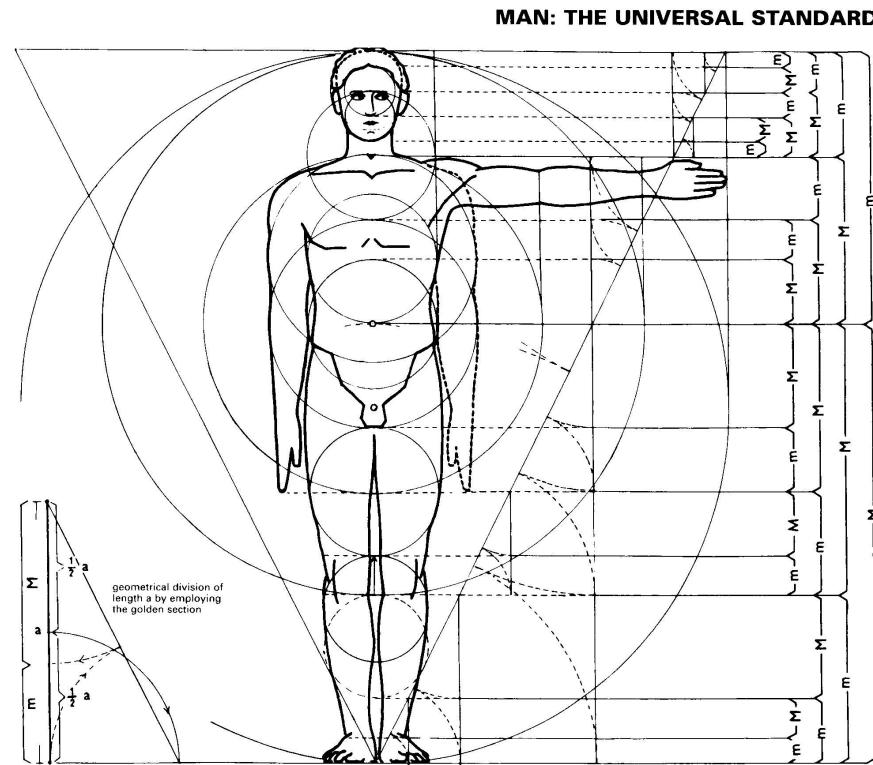
EGROID SANE CRIMINALS
ND NEGROID CIVIL INSANE
MOSAIC OF METRIC DIFFERENCES



HUMAN BODY

Standardisation

- Ernest Neufert (1900-1986)
 - Architects' Data



Man's dimensional relationships

The oldest known code of dimensional relationships of man was found in a burial chamber of the pyramids near Memphis and are estimated to date back to roughly 3000 BC. Certainly since then, scientists and artists have been trying hard to refine human proportional relationships.

We know about the proportional systems of the Empire of the Pharaohs, of the time of Ptolemy, the Greeks and the Romans, and even the system of Polycletes, which for a long time was applied as the standard, the details given by Alberti, Leonardo da Vinci, Michelangelo and the people of the Middle Ages. In particular, the work of Dürer is known throughout the world. In all of these works, the calculations for a man's body were based on the lengths of heads, faces or feet. These were then subdivided and brought into relationship with each other, so that they were applicable throughout general life. Even within our own lifetimes, feet and ells have been in common use as measurements.

The details worked out by Dürer became a common standard and were used extensively. He started with the height of man and expressed the subdivisions as fractions:

$1/2 h$ = the whole of the top half of the body, from the crotch upwards

$1/4 h$ = leg length from the ankle to the knee and from the chin to the navel

$1/6 h$ = length of foot

$1/8 h$ = head length from the hair parting to the bottom of the chin, distance between the nipples

$1/10 h$ = face height and width (including the ears), hand length to the wrist

$1/12 h$ = face width at the level of the bottom of the nose, leg width (above the ankle) and so on.

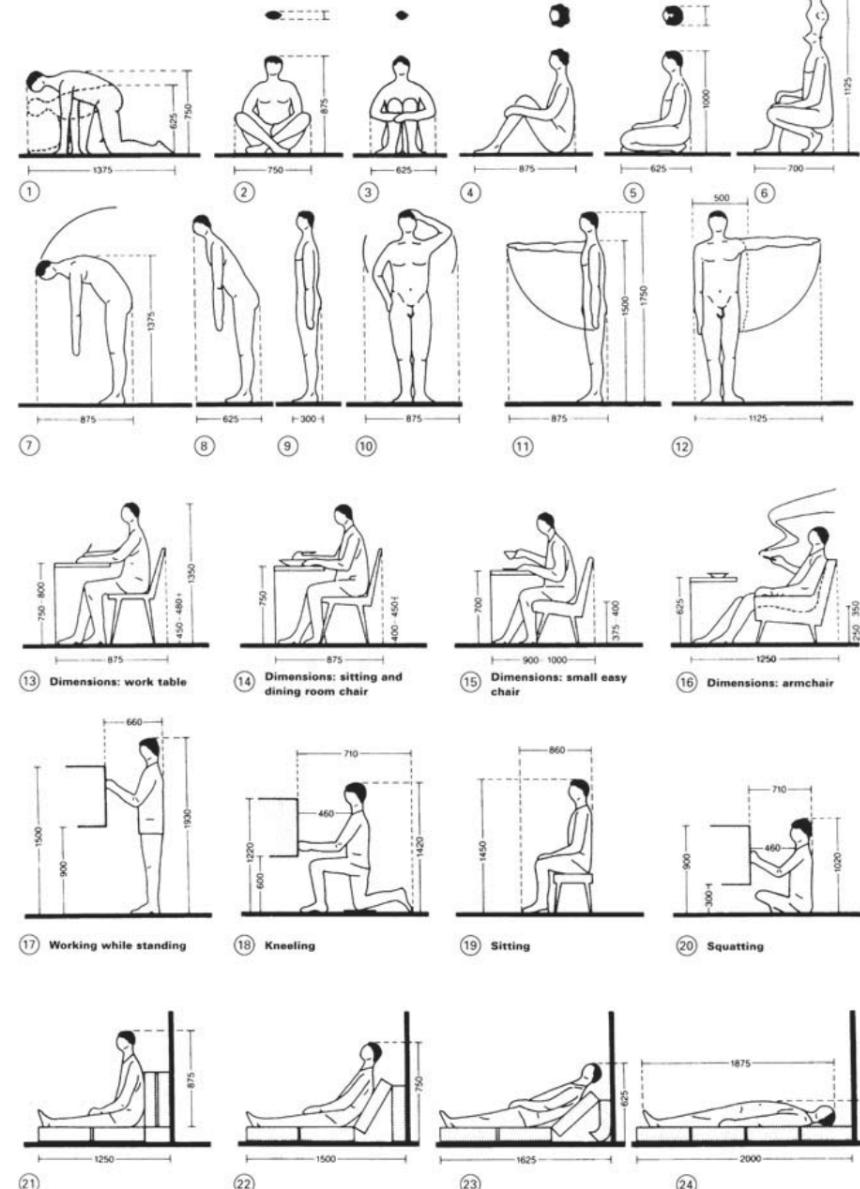
The sub-divisions go up to $1/40 h$.

During the last century, A. Zeising, brought greater clarity with his investigations of the dimensional relationship of man's proportions. He made exact measurements and comparisons on the basis of the golden section. Unfortunately, this work did not receive the attention it deserved until recently, when a significant researcher in this field, E. Moessel, endorsed Zeising's work by making thorough tests carried out following his methods. From 1945 onwards, Le Corbusier used for all his projects the sectional relationships in accordance with the golden section, which he called 'Le Modulor' → p. 30.

MAN: DIMENSIONS AND SPACE REQUIREMENTS

Body measurements

In accordance with normal measurements and energy consumption

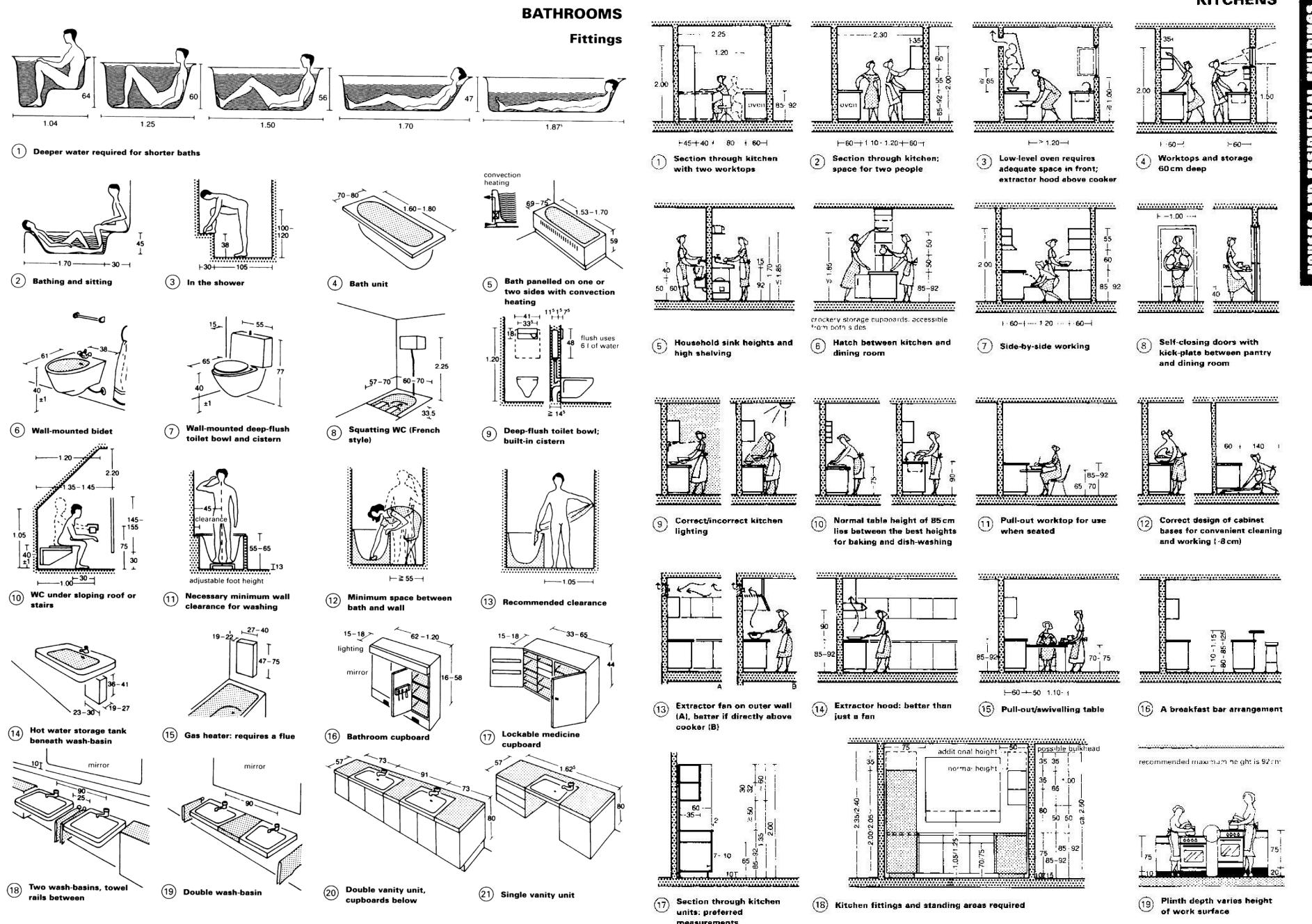


Architects' Data, Ernst Neufert

HUMAN BODY

Human Dimension

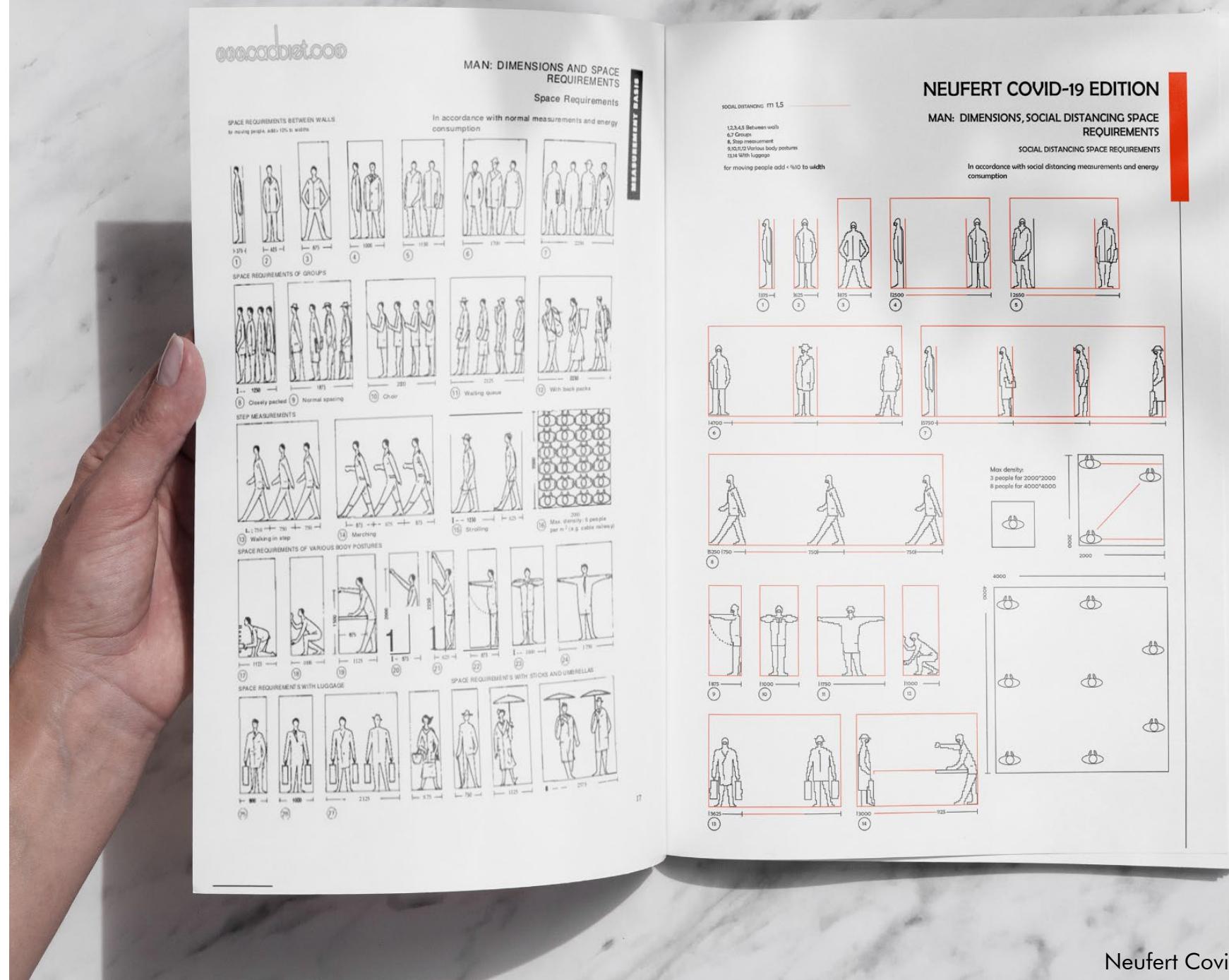
- Ernest Neufert (1900-1986)
 - Architects' Data



HUMAN BODY

Human Dimension

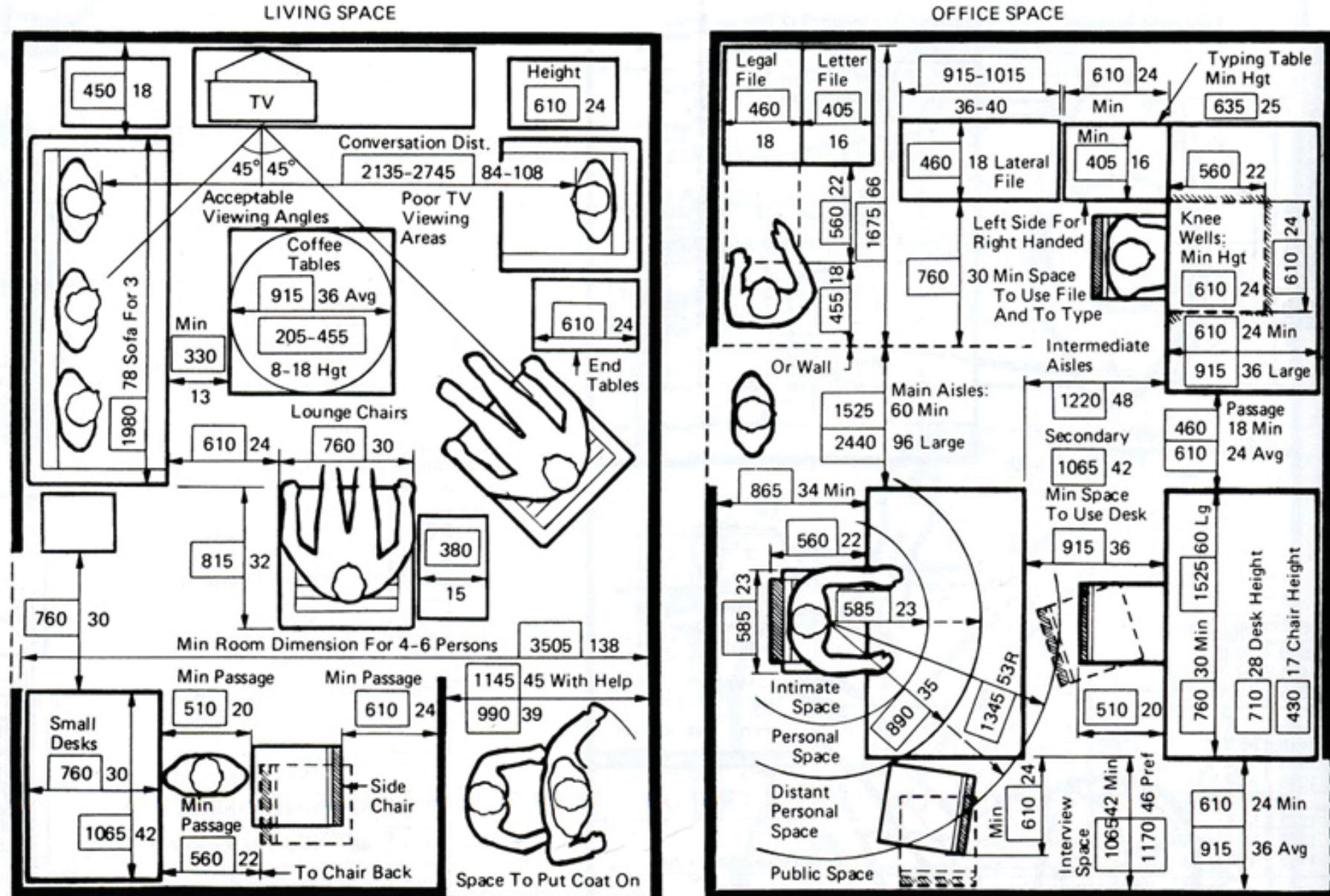
- Ernest Neufert (1900-1986)
 - Architects' Data



HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
 - Quality



HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
 - Quality



DrawerStore™ Compact Knife Organiser, Joseph Joseph

HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
- Quality



© 12,361

The Sims 4 Gameplay, EA Games

HUMAN BODY

Standardisation

- Compatibility
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- Repeatability
 - Quality

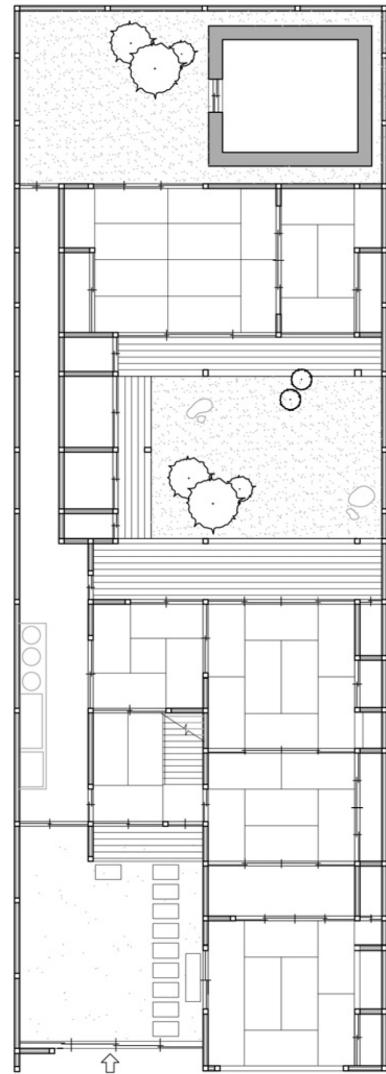


Traditional Japanese Interior

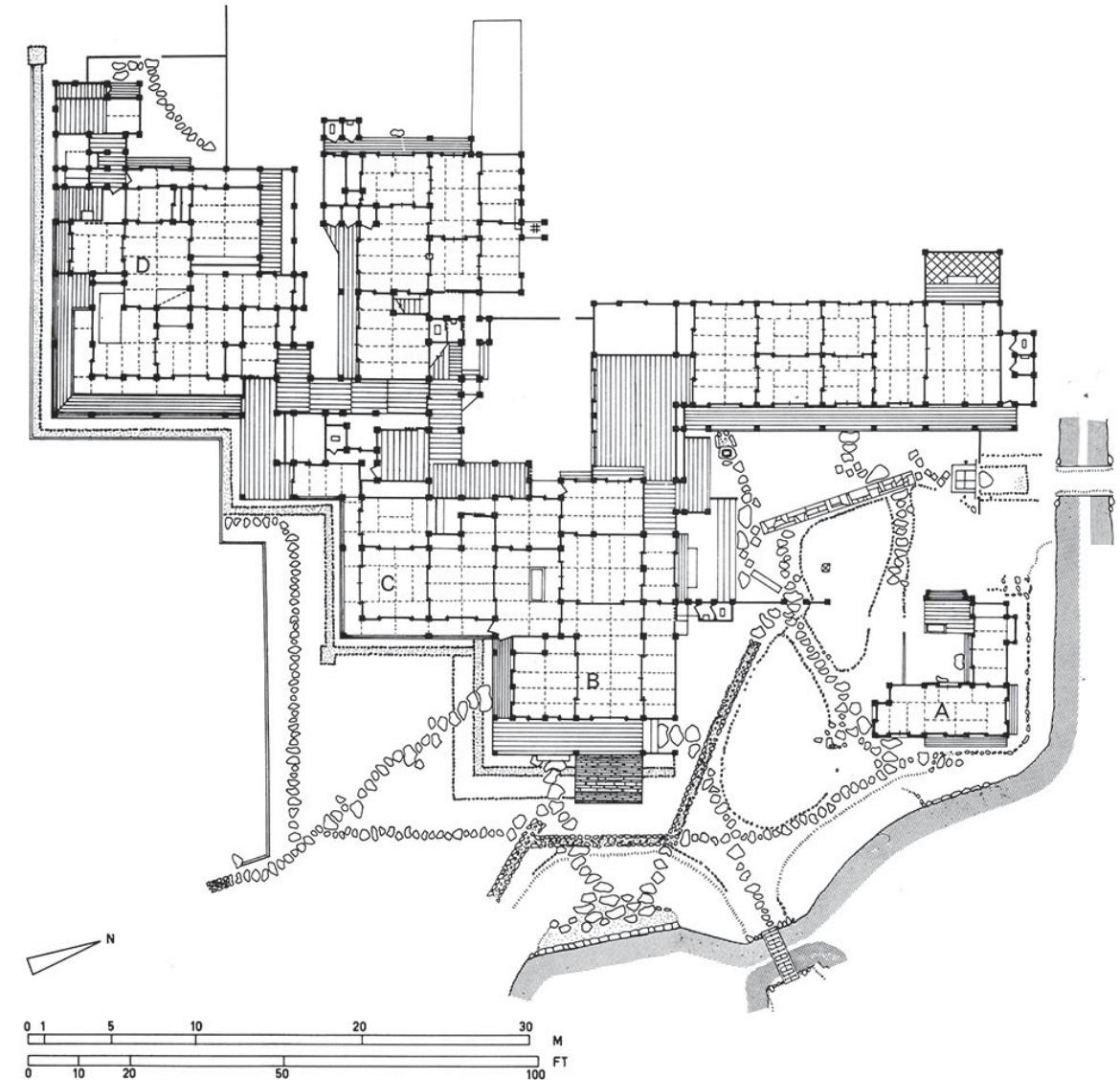
HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
 - Quality



Plan of modern Japanese House



Katsura Imperial Villa, 1700s

HUMAN BODY

Furniture



Skara Brae, Orkney, Scotland, 3500 BC

HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
 - Quality

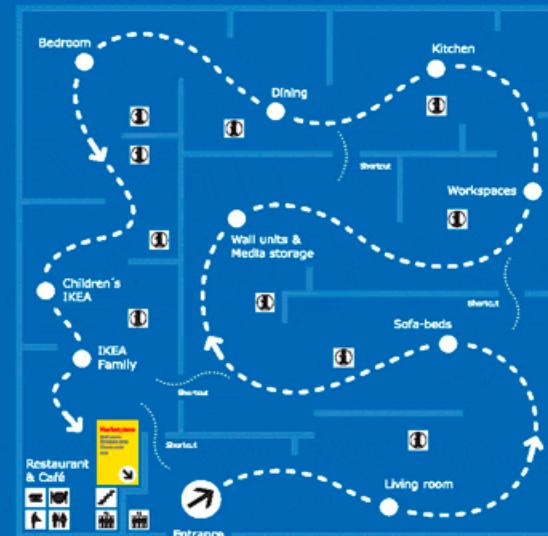


HUMAN BODY

Standardisation

- Compatibility
 - Safety
- Repeatability
 - Quality

Find your way in the SHOWROOM SECOND FLOOR



Living room

Armchairs
Chairs
Coffee/side tables
Sofas
Sofa-beds

Wall units & Media storage

Bookcases
CD & DVD storage
TV/Entertainment units

Workspaces

Computer tables
Desks
Drawer units

Office storage

Swivel chairs

Kitchen

Kitchen cabinets
Kitchen doors
Counter tops
Kitchen sinks, faucets
Kitchen accessories
Free standing kitchens

Dining

Dining tables
Dining chairs
Folding chairs & stools
Folding tables
Table bar

Bedroom

Beds
Bedside tables
Bunk beds
Chest of drawers
Closet storage systems
Mattresses

Children's IKEA

Bed & Crib linens
Children's beds
Child safety items
Cribs
Storage items
Toys

Restaurant & Café



Find your way in the MARKETPLACE GROUND FLOOR



Cookshop & Tableware

Cutlery
Tableware
Glasses and jars
Pots and pans

Textiles

Cushions
Fabrics
Quilts & Pillows
Sheets & Pillowcases
Window treatments

Rugs & Flooring

Flooring
Oriental carpets
Rugs

Bathroom

Bathroom accessories
Bathroom cabinets
Medicine cabinets
Shower curtains
Towels
Vanity

Home organization

Clothing storage
Desk accessories
Garage storage
Shelves & brackets
Storage boxes

Lighting

Ceiling & wall lamps
Floor lamps
Table lamps
Lightbulbs
Lighting accessories

Wall decoration & Mirrors

Picture frames
Posters
Mirrors

Home decoration

Baskets
Candles
Gift Wrap
Plants & Pots
Rattan furniture
Vases

Self-serve furniture area

Check-outs
Furniture pick-up

Home delivery

Customer service

Bistro

Swedish food market

Restrooms

Babycare

Telephone

Småland

Exit

Find your way in SELF-SERVE GROUND FLOOR



IKEA Canton

41640 Ford Road, Canton, MI 48187
Phone: 734-981-6300 IKEA-USA.com

Store hours

Open Daily

10:00am - 9:00pm

Restaurant hours

Open Daily

9:30am - 8:30pm

HUMAN-CENTRED DESIGN

Sunk-Cost Fallacy?

HUMAN BODY

Human Senses

- Sight
- Hearing
- Smell
- Taste
- Touch

+

- Proprioception

Brain understanding of body in space

- Thermoception

Perception of temperature



Olafur Eliasson
The Weather Project, Turbine Hall, Tate Modern, London, 2003

HUMAN BODY

Human Senses

- Sight
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James Turrell, Guggenheim Museum, 2013

HUMAN BODY

Human Senses

- Sight
- Hearing
- Smell
- Taste
- Touch

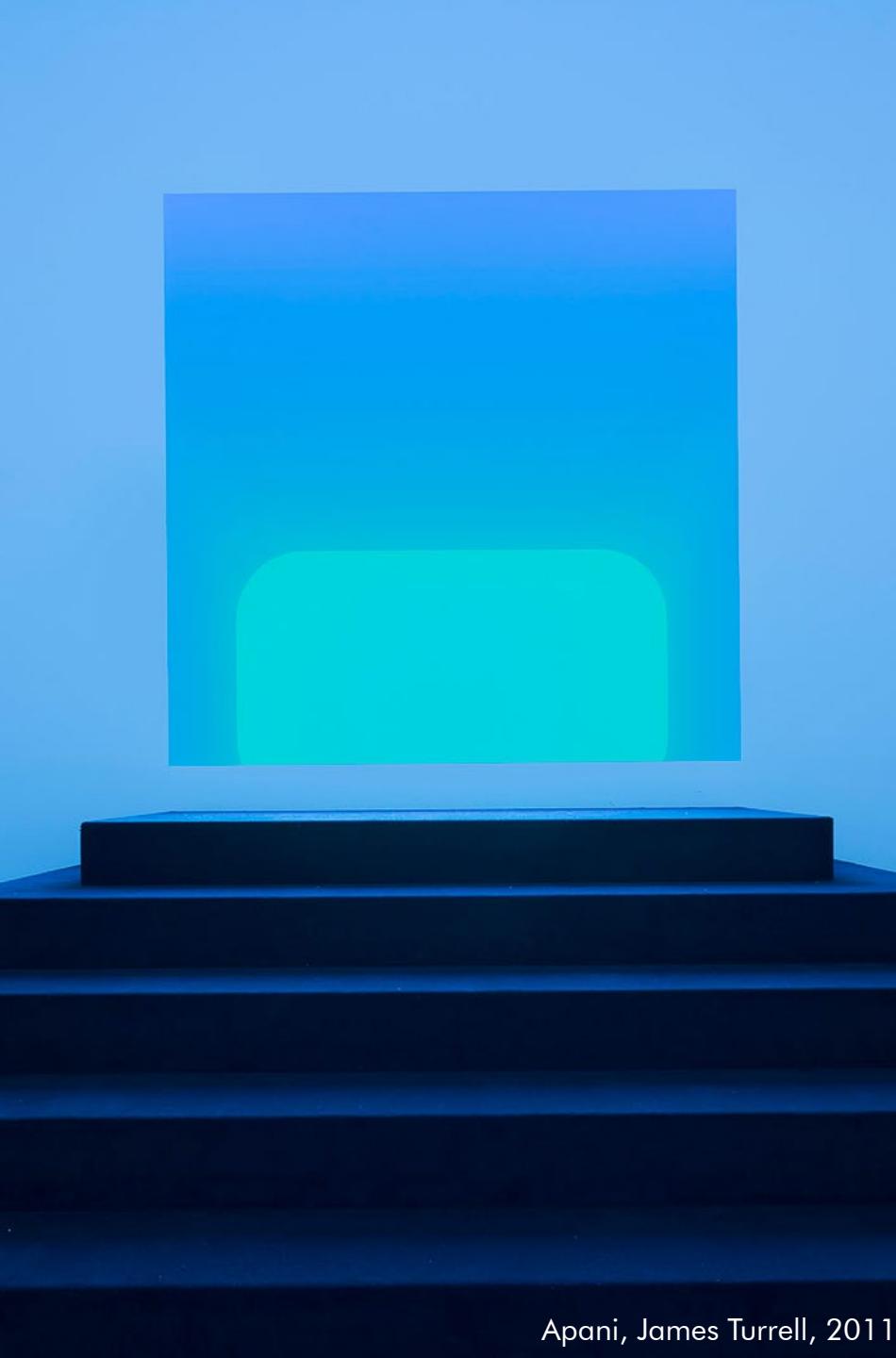
+

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Brain understanding of body in space

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Perception of temperature



Apani, James Turrell, 2011



The Color Inside, Overland Partners + James Turrell, 2013

HUMAN BODY

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Drake
Hotline Bling, 2016

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Perception of temperature

MUJI
無印良品



Muji Hut, 2017

HUMAN BODY

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- Sight
- Hearing
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- Taste
- Touch
- +
• Proprioception

Brain understanding of body in space

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Perception of temperature



Muji Prefabricated Home, 2020

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Muji Prefabricated Home, 2020

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Bic Camera Storefront, Japan

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Mercedes Benz Perfume

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Perception of temperature



Garrett Popcorn, Siam Paragon, 2014

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Perception of temperature



Atrium Space, Siam Paragon

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- Smell
- Taste
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HUMAN BEHAVIOURS

Human Thought

- Why do we need to know about the human mind?



Louis Kahn Thinking

HUMAN BEHAVIOURS

*Because things are designed to be used by people,
and without a deep understanding of people, the
designs are apt to be faulty, difficult to use, difficult
to understand* – Don Norman

HUMAN BEHAVIOURS

Simple Experiment on
Consciousness

HUMAN BEHAVIOURS

1. Wiggle the second finger of your hand.
2. Wiggle the third finger of the same hand.
3. Describe what you did differently those two times.

HUMAN BEHAVIOURS

Consciousness

- Most of the brain's operations are **sub-conscious**, hidden beneath our awareness.
- It is only the highest level, what I call **reflective**, that is **conscious**. – Don Norman



HUMAN BEHAVIOURS

Consciousness

- Most of the brain's operations are **sub-conscious**, hidden beneath our awareness.
- It is only the highest level, what I call **reflective**, that is **conscious**. – Don Norman

Sub-conscious	Conscious
Fast	Slow
Automatic	Controlled
Multiple Resources	Limited Resource
Controls skilled behavior	Invoked for novel situations: when learning, when in danger, when things go wrong

HUMAN BEHAVIOURS

Cognition & Emotion

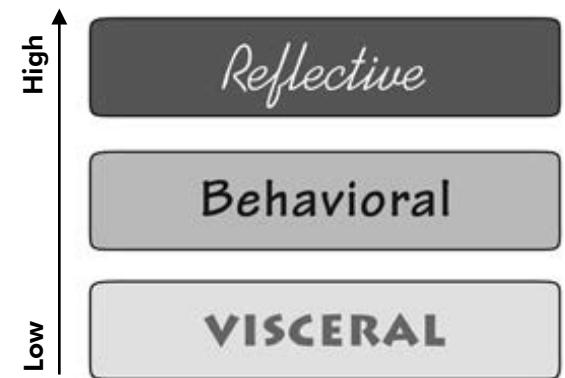
- We tend to believe that our thought can be separated from emotion. **This is false!**
- The brain is structured to act upon the world, and every action carries with it expectations, and these expectations drive emotions
 - Cognition provides understanding
 - Emotion provides value judgments



Jackass Presents: Bad Grandpa, 2013

HUMAN BEHAVIOURS

Three Levels of Processing



HUMAN BEHAVIOURS

Visceral Level

- The **most basic** level of processing (AKA 'The Lizard Brain')
- Visceral responses are **fast and automatic**
 - Genetically programmed behaviors such as, fear of heights, dislike of the dark or very noisy environments, dislike of bitter tastes and the liking of sweet tastes, and so on.
- Relatively unaffected by context or history
- Visceral learning takes place primarily by sensitization or desensitization through such mechanisms as adaptation and classical conditioning.



Alex Honnold, Yosemite National Park

HUMAN BEHAVIOURS

Visceral Response

- Immediate Perception
- *Harmonious vs Jarring*
- Appearance, Sight, Sound, Smell, or Touch
 - Has nothing to do with how usable, effective, or understandable the product is.
- It is all about simplistic attraction or repulsion



Ferrari Roma, 2020

HUMAN BEHAVIOURS

Behavioral Level

- Home of **learned skills**, triggered by situations.
- Actions and analyses at this level are largely subconscious.
 - Learned skill/Behaviours i.e. driving a car, riding a bike, action of writing or speaking, or playing sport.
 - For well-learned action, all we have to do is think of the goal and the behavioral level handles all the details.



Lionel Messi, 2022

HUMAN BEHAVIOURS

Behavioral Response

- Every action is associated with an expectation
 - Positive or Negative feedbacks
 - Feedbacks reassure the sense of control
 - Lack of feedback creates a feeling of lack of control, which can be unsettling
 - Managing Expectation



Shibuya Intersection

HUMAN BEHAVIOURS

Reflective Level

- Conscious cognition
 - Deep & Slow
- Evaluation, Deep understanding, Decision-making
- It often occurs after the events have happened. It is a reflection or looking back over them, evaluating the circumstances, actions, and outcomes, often assessing blame or responsibility
- The highest levels of emotions come from the reflective level



The Thinker, August Rodin, 1904

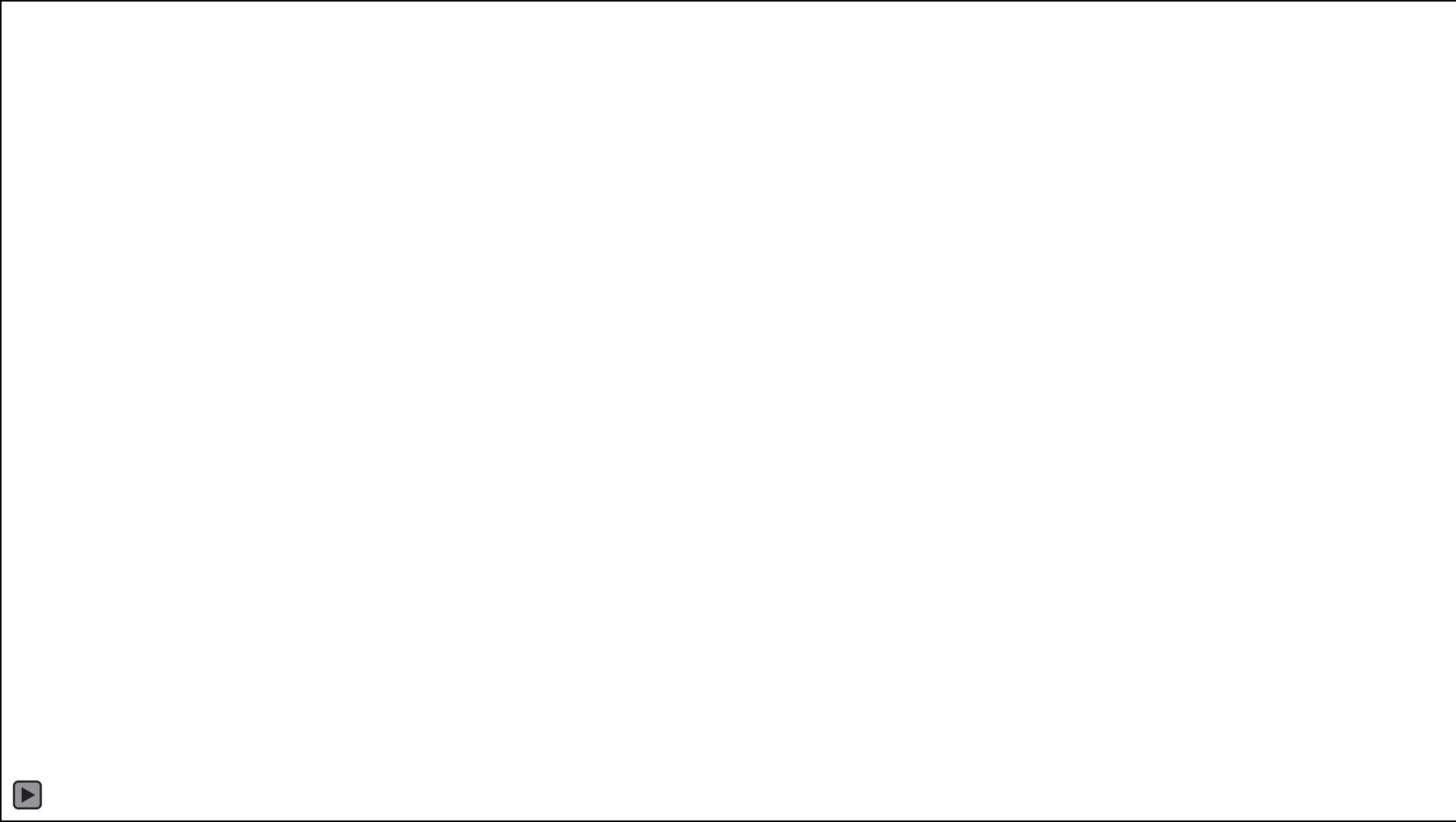
HUMAN BEHAVIOURS

Reflective Response

- The 'most important'
- Reflective responses are part of our memory of events
- Memories last far longer than the immediate experience or the period of usage, which are the domains of the visceral and behavioral levels.
- It is reflection that drives us to recommend a product, to use it or perhaps to avoid it.



Kyoto, Japan



HUMAN BEHAVIOURS

Fun Theory

- 'Novelty'



Piano Stair, Sweden, 2009

HUMAN BEHAVIOURS

Flow

- 'In the zone'
- Hungarian-American psychologist **Mihaly Csikszentmihalyi**
- In flow state, individual would lost track of time & outside environment,
- Proper level of difficulty, provide challenge & require our attention, but not so much that it invokes frustration & anxiety.
- Slightly above our skill level (stretch but not snap)



HUMAN BEHAVIOURS

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Musician Performing

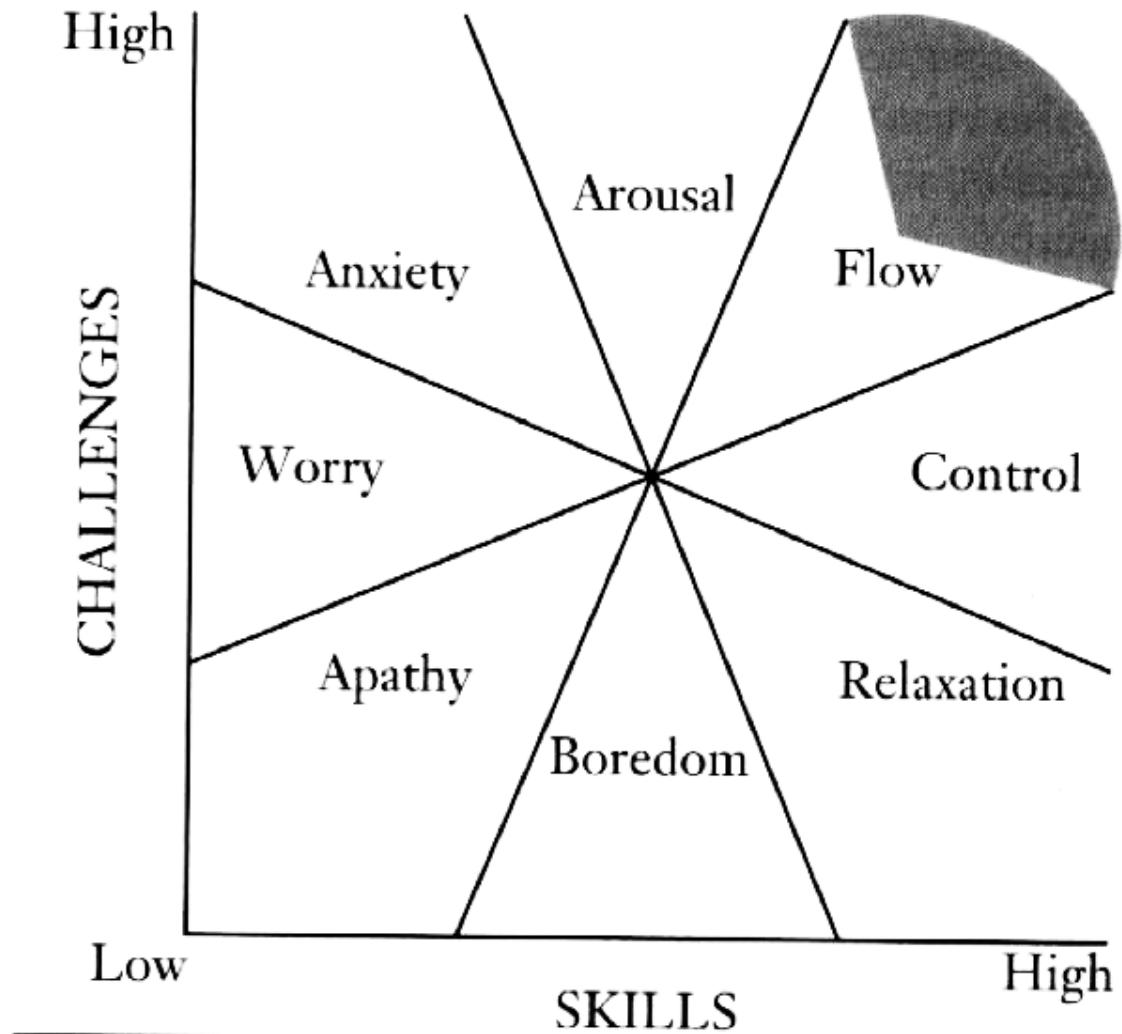
HUMAN BEHAVIOURS

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Figure 1

The quality of experience as a function of the relationship between challenges and skills. Optimal experience, or flow, occurs when both variables are high.



Sources: Adapted from Massimini & Carli 1988; Csikszentmihalyi 1990.

Diagram explaining flow state

HUMAN BEHAVIOURS

Entering Flow

- Concentration
- Distraction Management



Sebastian Vettel listening to music prior to qualifying

HUMAN BEHAVIOURS

Intrinsic Motivators

- Curiosity
- Passion
- Purpose
- Autonomy
- Mastery

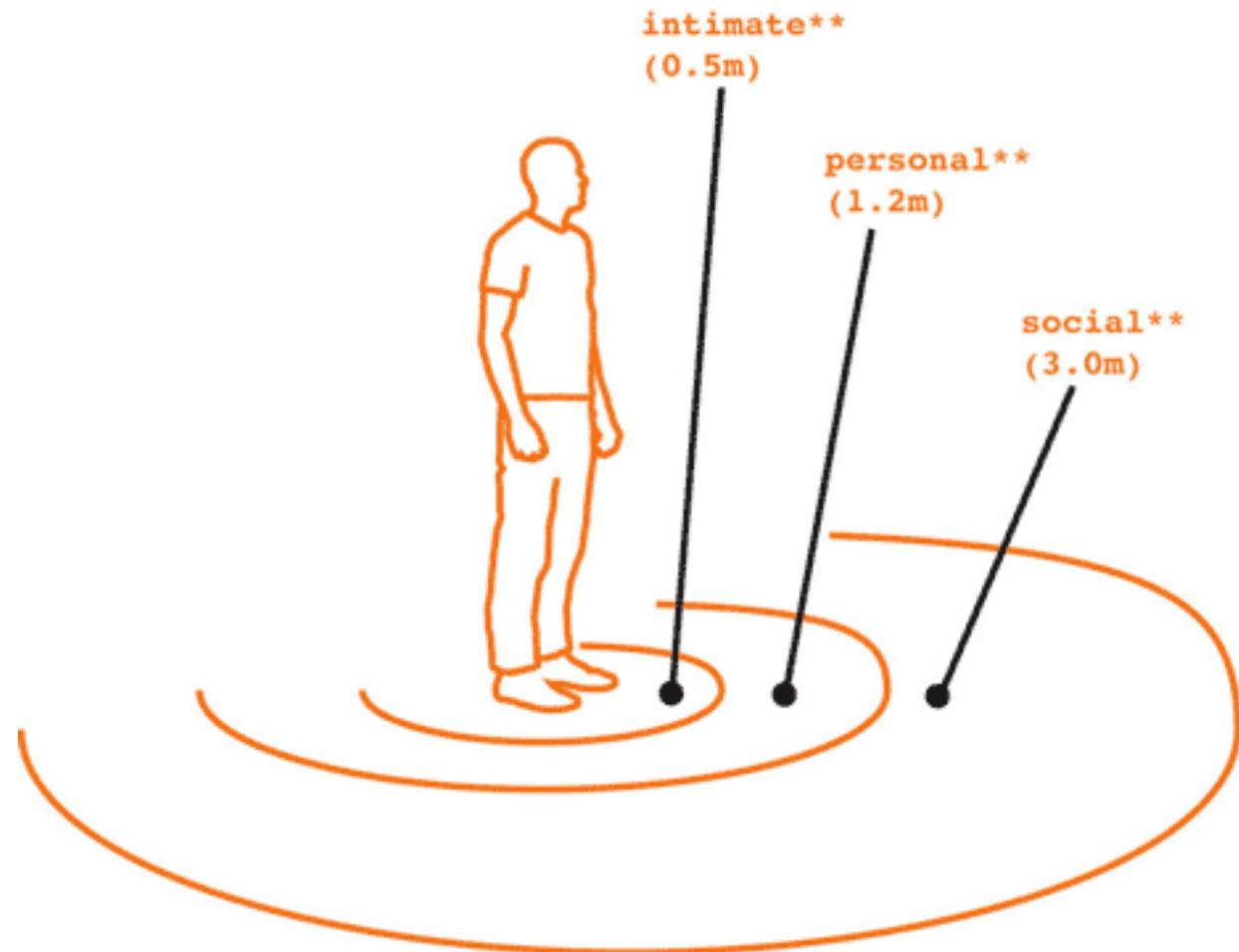


Michael Jordan, Slam Dunk Contest, 1988

HUMAN BEHAVIOURS

Proxemics

- study of human use of space and the effects that population density has on behaviors, communication, and social interaction.
- **Intimate distance** for embracing, touching or whispering
- **Personal distance** for interactions among good friends or family
- **Social distance** for interactions among acquaintances



HUMAN BEHAVIOURS

Personal Proximity

- Cultural Difference



Railway Station, India

HUMAN BEHAVIOURS

Personal Proximity

- Cultural Difference

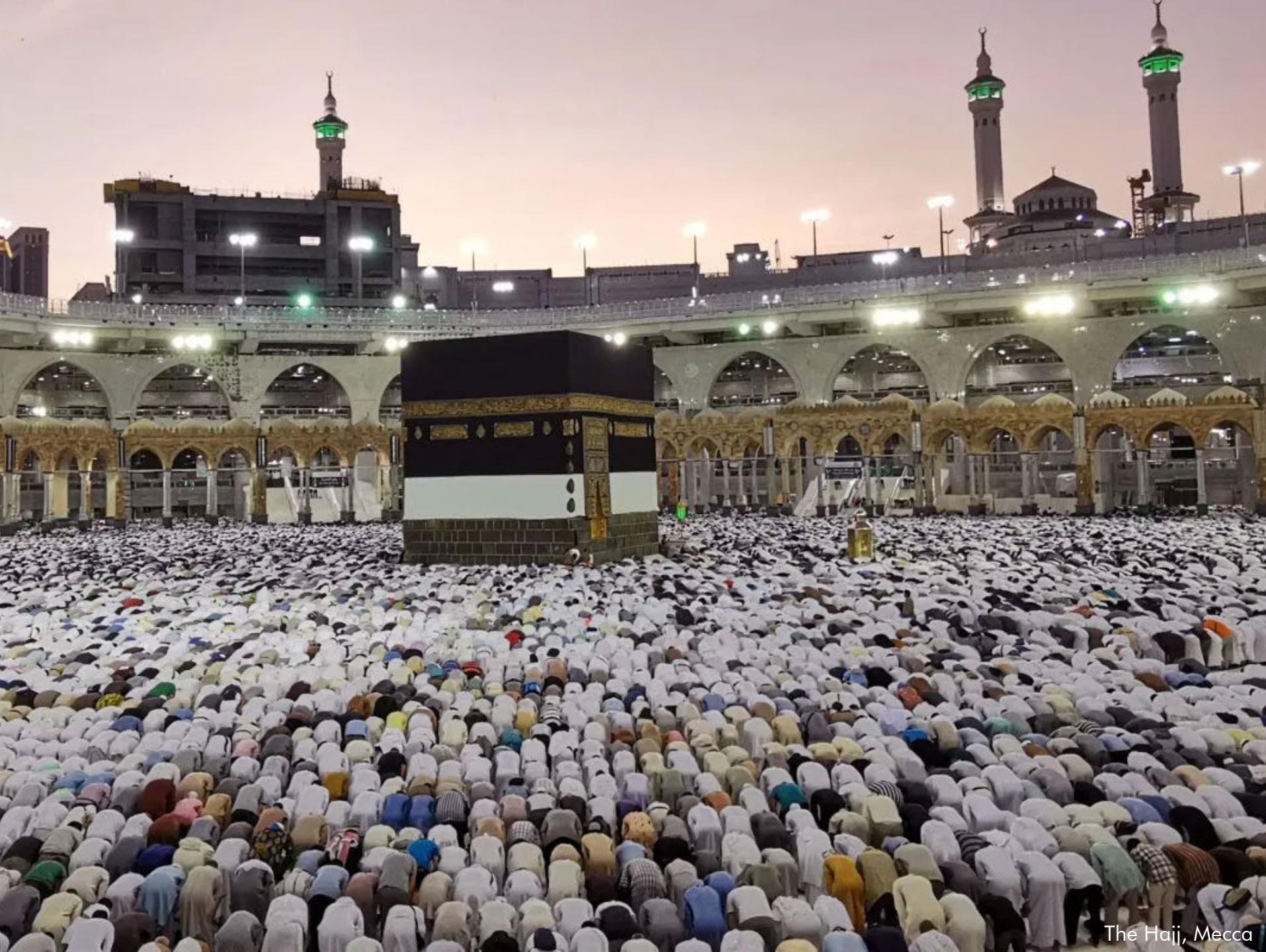


Bus Stop, Stockholm, Sweden

HUMAN BEHAVIOURS

Personal Proximity

- Activities



The Hajj, Mecca

HUMAN BEHAVIOURS

Personal Proximity

- Activities



Black Pink (Born Pink), Bangkok, Thailand, 2023

HUMAN BEHAVIOURS

Personal Proximity

- Circumstances



Morning Rush Hour, Tokyo, Japan

HUMAN BEHAVIOURS

Personal Proximity

- Circumstances



London Underground, London

HUMAN BEHAVIOURS

Personal Proximity

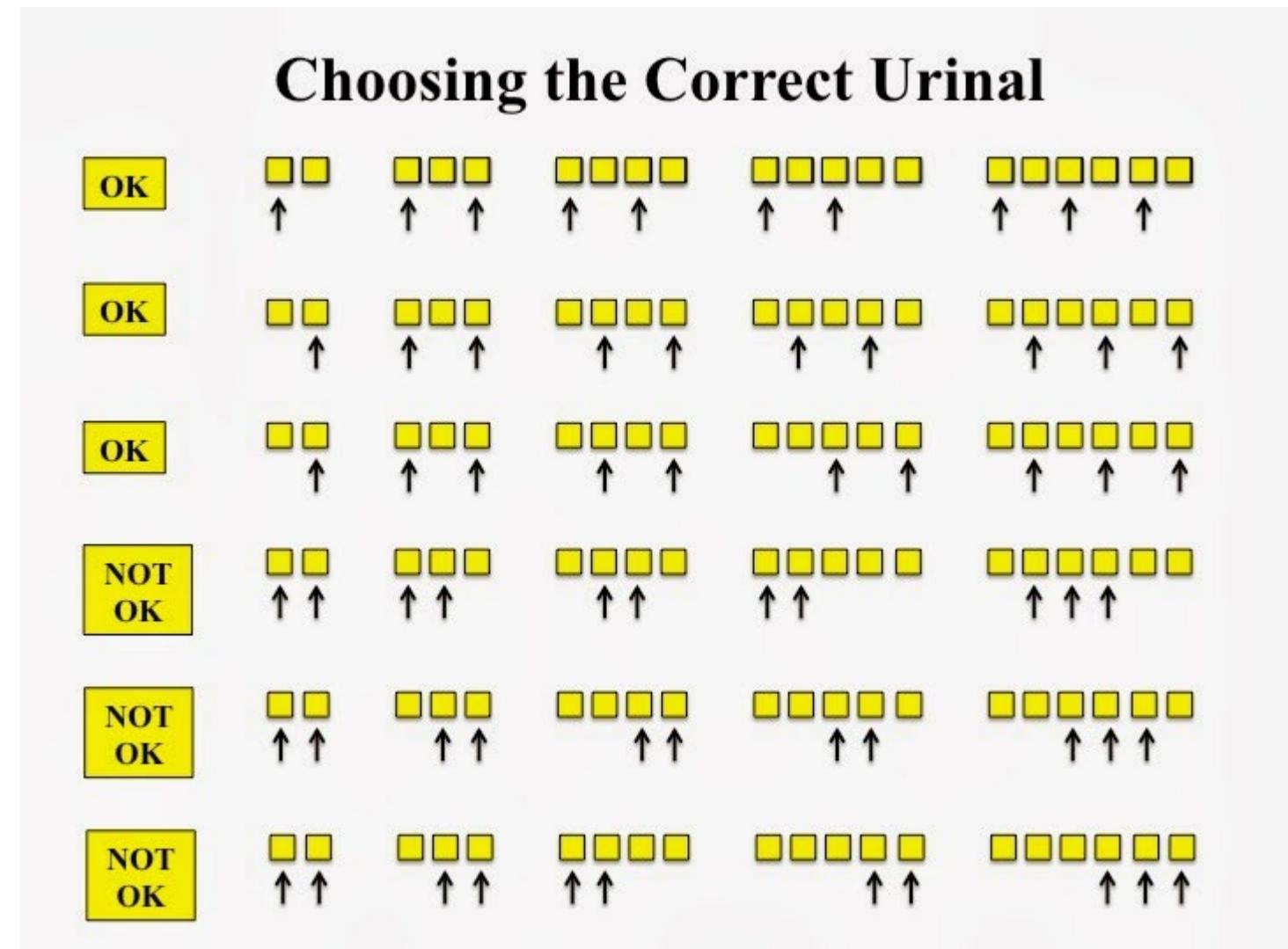
- Circumstances



HUMAN BEHAVIOURS

Personal Proximity

- Circumstances



HUMAN BEHAVIOURS

Personal Proximity

- Economic/Circumstances

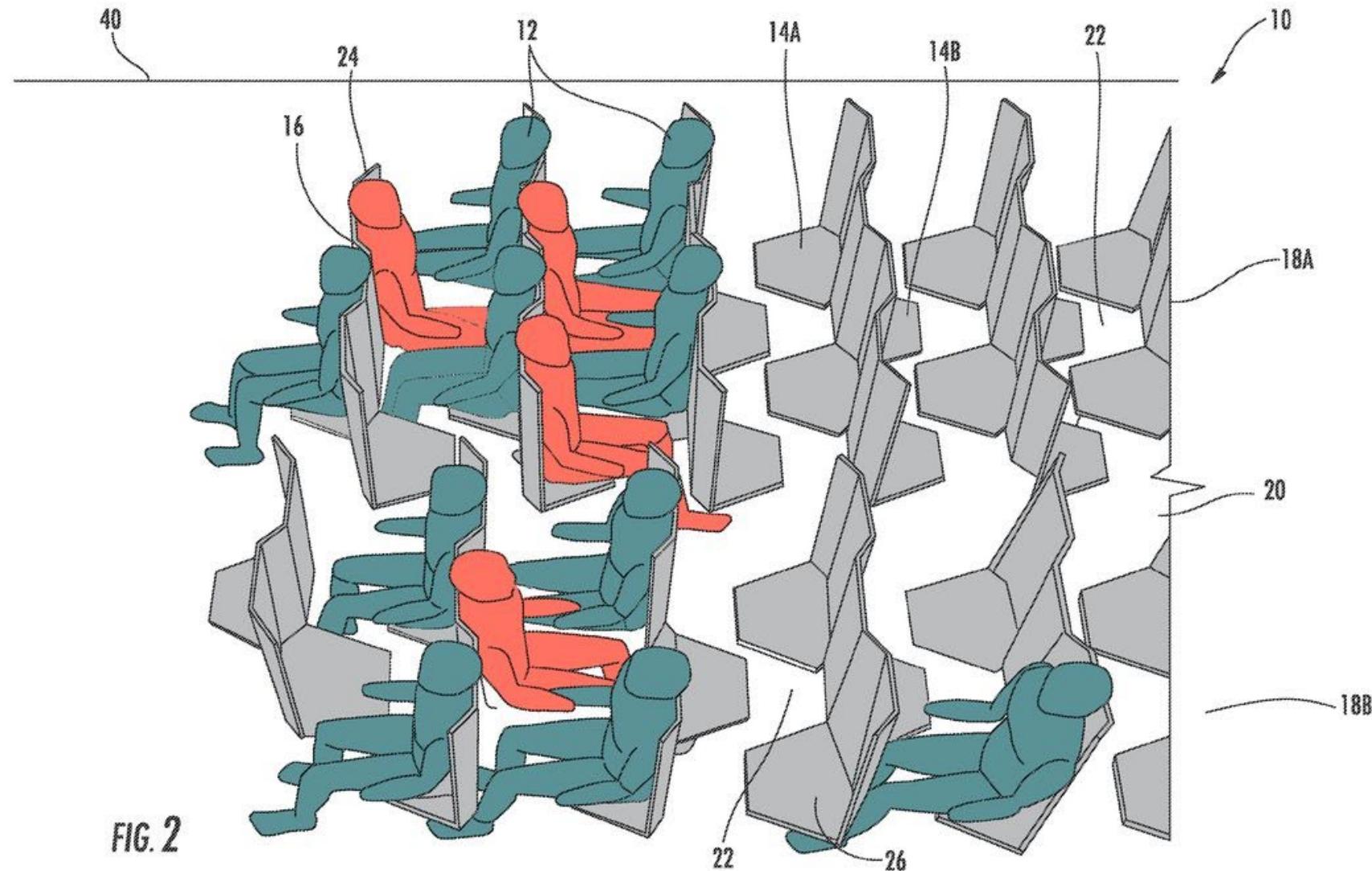
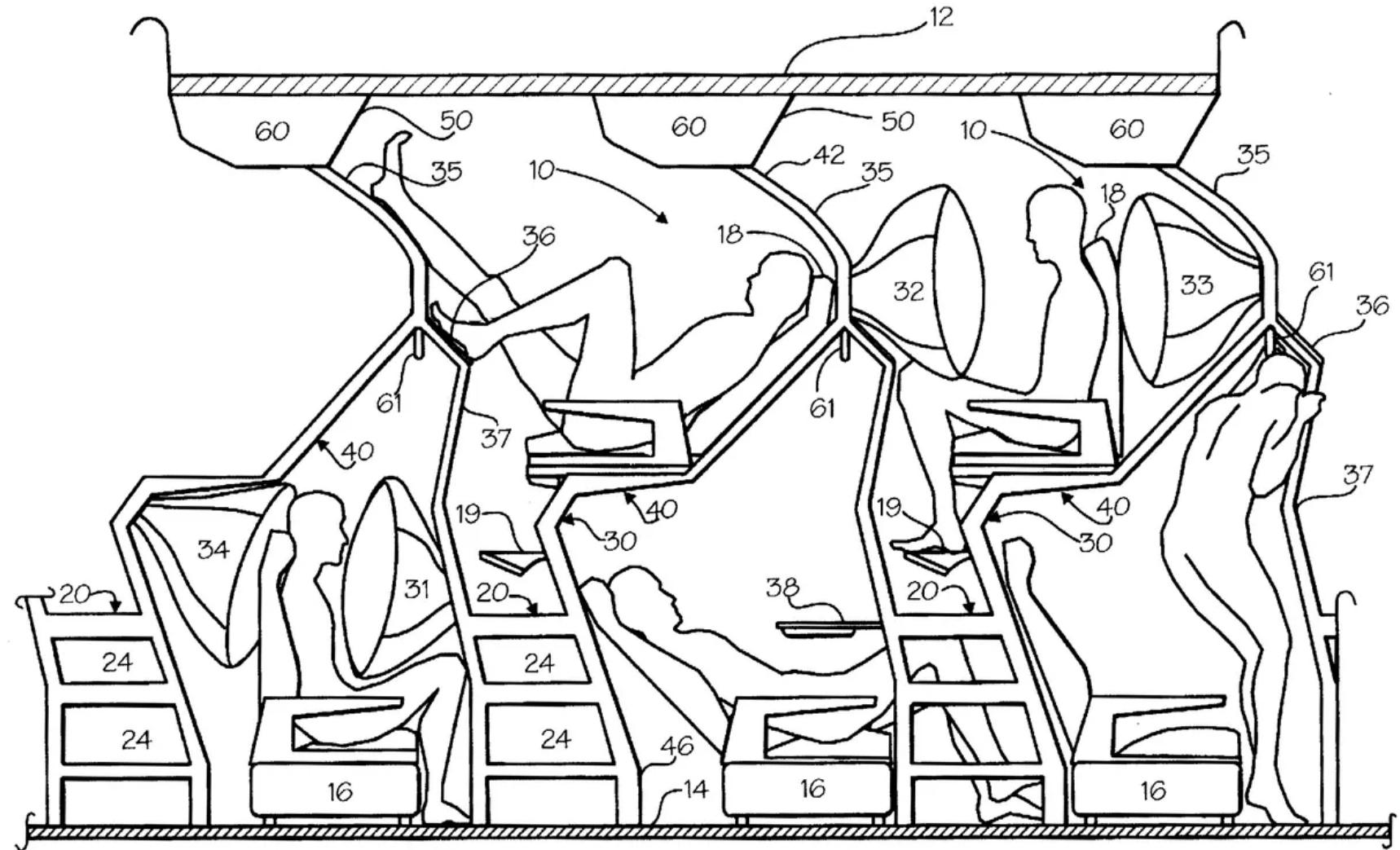


FIG. 2

HUMAN BEHAVIOURS

Personal Proximity

- Economic/Circumstances



HUMAN BEHAVIOURS

Personal Proximity

- Economic/Circumstances



Sam Chui testing prototype seat for short-haul flight

HUMAN BEHAVIOURS

Personal Proximity

- Rule/Safety/Precaution



Social Distancing, Bangkok, 2020

GOOD/BAD DESIGN

- Communication / Understanding
- Good Design Characteristics
- Intentionally Difficult Design



The Masochist's Coffee Pot, Jacque Carelman, 1980s

*Let's talk about **vacuum cleaners***

Problems / Pain-point?



Problems / Pain-point?

- Mobility
- Battery-life
- Suction Power
 - Cleaning
- Compatibility



Do you normally dream about owning a vacuum cleaner?

Dyson



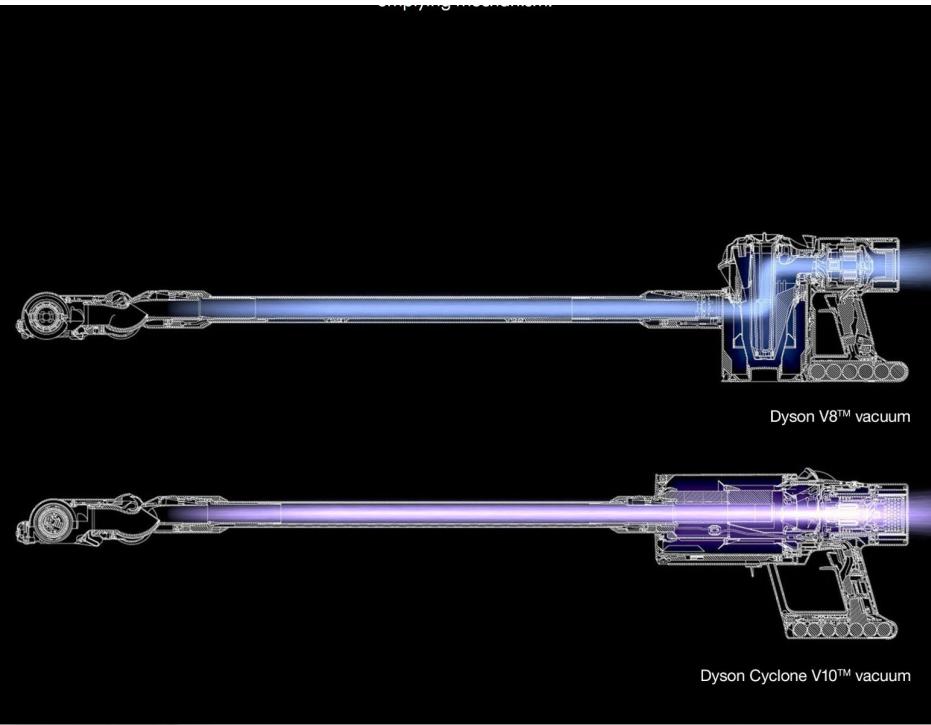
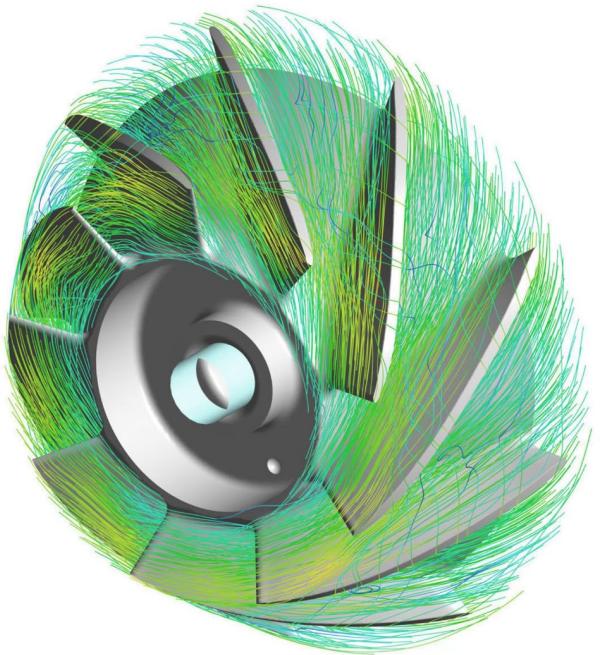
James Dyson



Generations of Dyson Vacuum Cleaner

Dyson

- Innovation
- Engineering / Technologies
 - Disruption



Dyson



Dyson



Differences?



Exposing Components



Left – Dyson Cyclone Assembly
Right – Radial Aircraft Engine

Styling

Industrial

Machine

Utilitarian

Precision



General Electric GEnx Engine, 2006



Pratt & Whitney R-2800 Double Wasp, 1939



Kuka KR-60 Robotic Arm



Kuka Assembly Line

Visual
Intuitive
Transparency
Colors



Point and Shoot Mechanism

Visual
Intuitive
Transparency
Colors



Dyson V8

Hair Dryer?



Dyson Supersonic Hair Dryer, 2016

Copycats?



GOOD/BAD DESIGN

Can we relate to this?



GOOD/BAD DESIGN

Norman Door

- A door where the design tells you to do the **opposite** of what you are actually supposed to do.
- A door that gives the wrong signal and **needs a sign** to correct it.

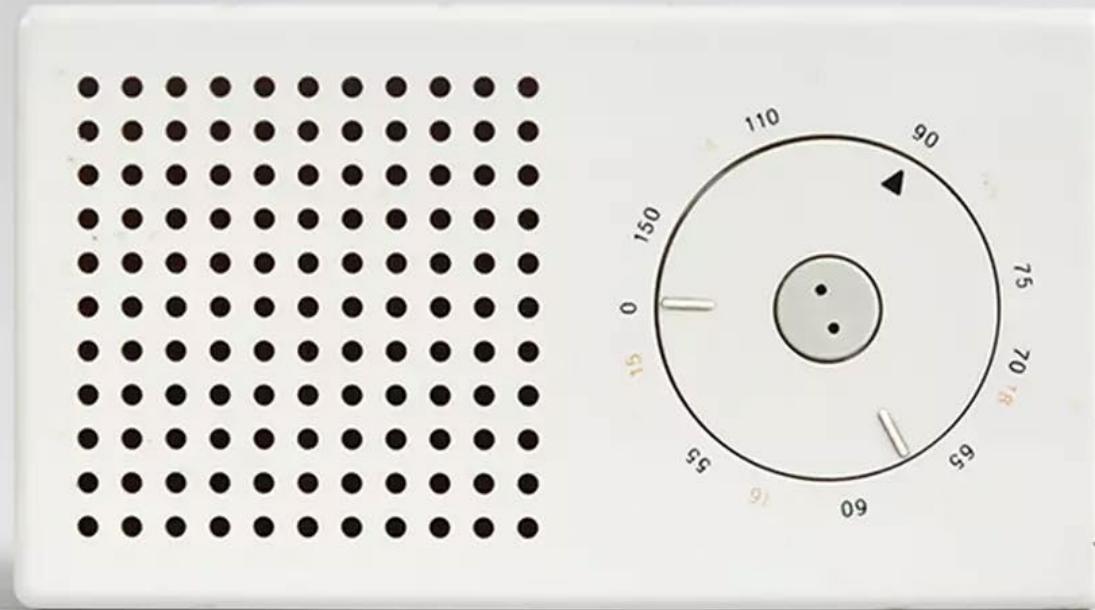


Norman Doors

GOOD/BAD DESIGN

"Design is really an act of **communication**, which means having a deep **understanding of the person** with whom the designer is communicating."

- Don Norman, 2002

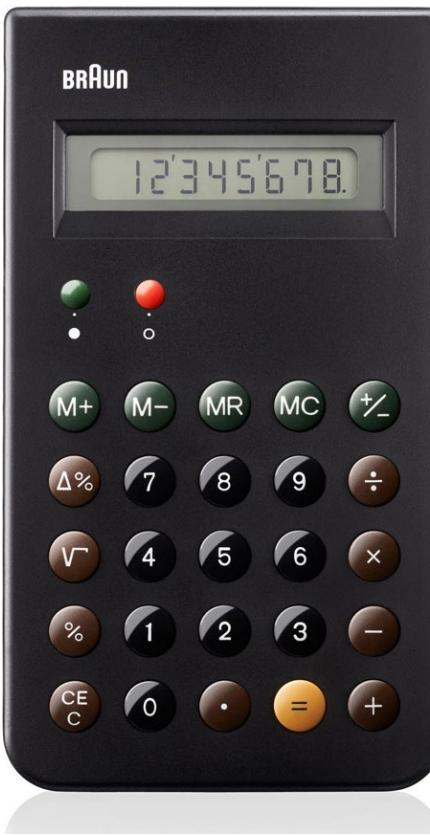


Dieter Rams
The T 3 Pocket Radio, Braun, 1958

GOOD/BAD DESIGN

Good design is actually a lot harder to notice than poor design, in part because good designs fit our needs so well that the design is invisible.

- Don Norman, The Design of Everyday Things



Left - Braun Calculator, Dieter Ram, 1987
Middle - Apple's iOS 1 Calculator, 2007
Right - Apple's iOS 11 Calculator, 2017

GOOD/BAD DESIGN

What are the characteristics of a good design?

Vitruvius

De Architectura

- **Firmitas** - It should be structurally sound
- **Utilitas** - It must have a practical function
- **Venustas** - It should be beautiful

Firmitas

Durability/Structure

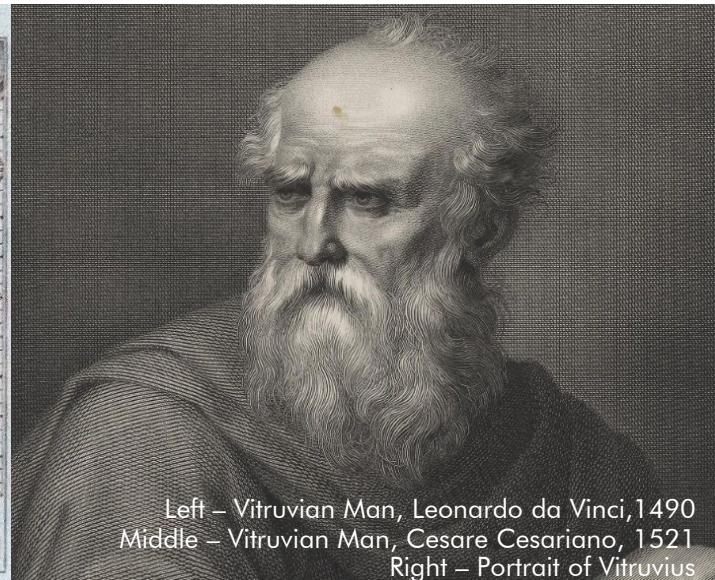
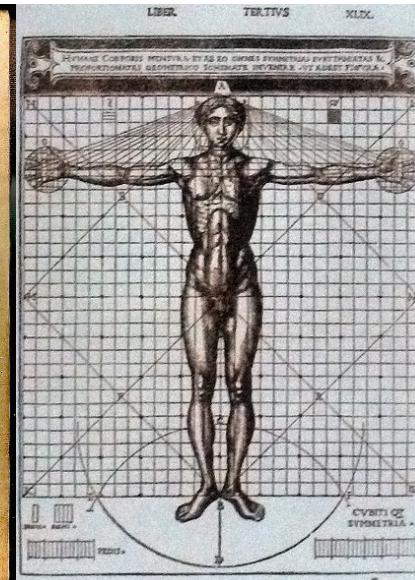
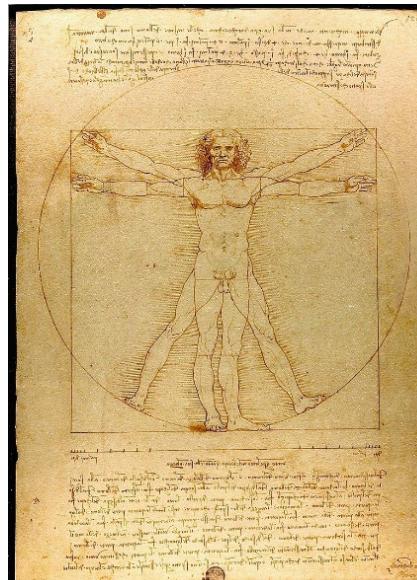
Good Design

Utilitas

Usefulness/Function

Venustas

Aesthetics/Beauty



Left – Vitruvian Man, Leonardo da Vinci, 1490
Middle – Vitruvian Man, Cesare Cesariano, 1521
Right – Portrait of Vitruvius

Dieter Rams

10 Principles of Good Design

1. Good design is **innovative**
2. Good design makes a product **useful**
3. Good design is **aesthetic**
4. Good design makes a product **understandable**
5. Good design is **unobtrusive**
6. Good design is **honest**
7. Good design is **long lasting**
8. Good design is thorough down to the **last detail**
9. Good design is **environmentally friendly**
10. Good design is as **little design as possible**



Dieter Rams



Braun Products by Dieter Rams

Don Norman

The Design of Everyday Things

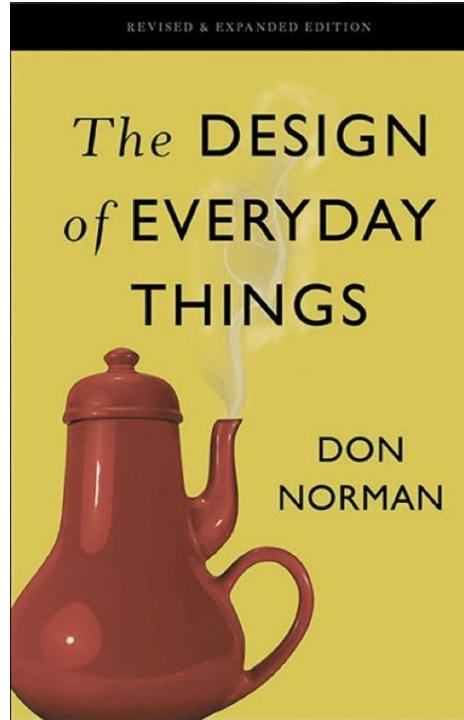
- **Discoverability**

Ability to figure out

- What actions are possible
- Where/how to perform them

- **Understanding**

- What does it all mean?
- How is it supposed to be used?
- What are the different controls/settings?



Don Norman

GOOD/BAD DESIGN

How about a deliberate bad design?

- *Difficult to use/operate*
- *Difficult to understand*

GOOD/BAD DESIGN

Deliberately Making Things Difficult

- Any door designed to keep people in or out.
- Security systems, designed so that only authorized people will be able to use them.
- Dangerous equipment, which should be restricted.
- Controls that require two or more simultaneous actions before the system will operate



Hidden Door



Table Saw



Security System

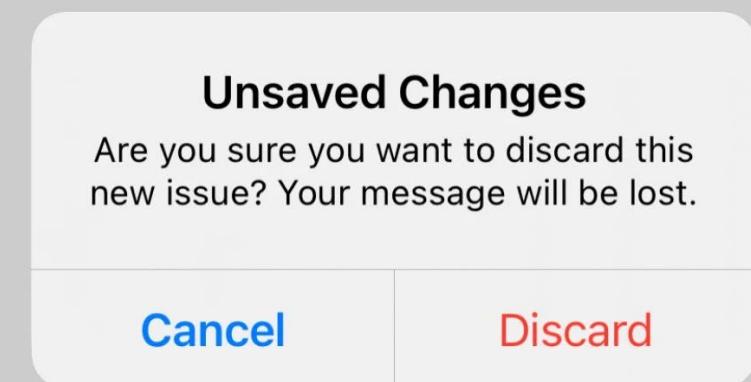
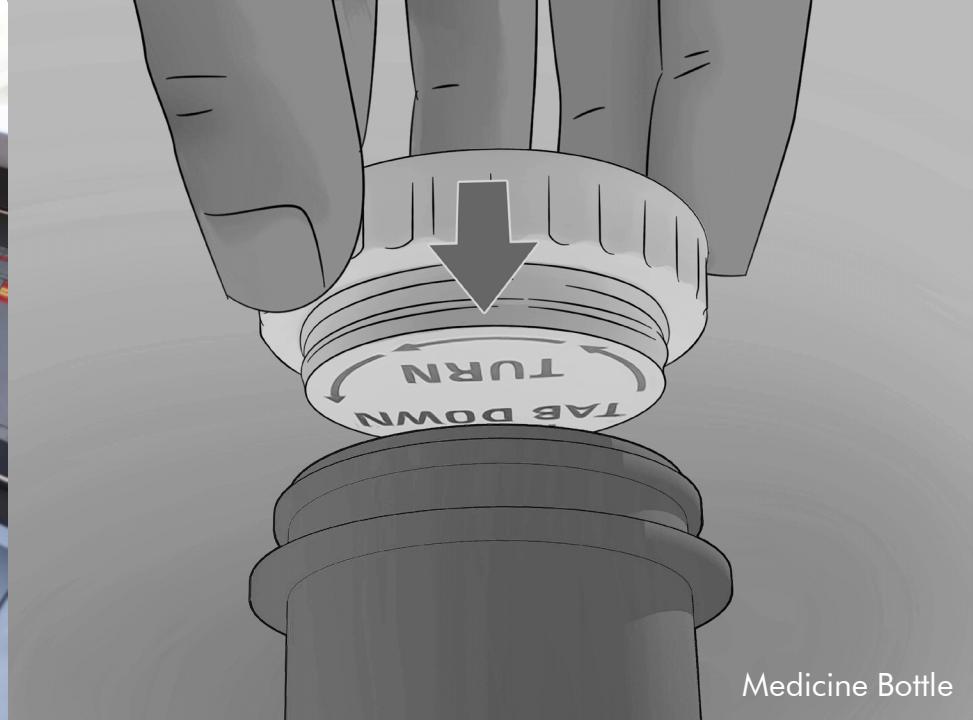


Donald Trump and the Nuclear Foosball

GOOD/BAD DESIGN

Deliberately Making Things Difficult

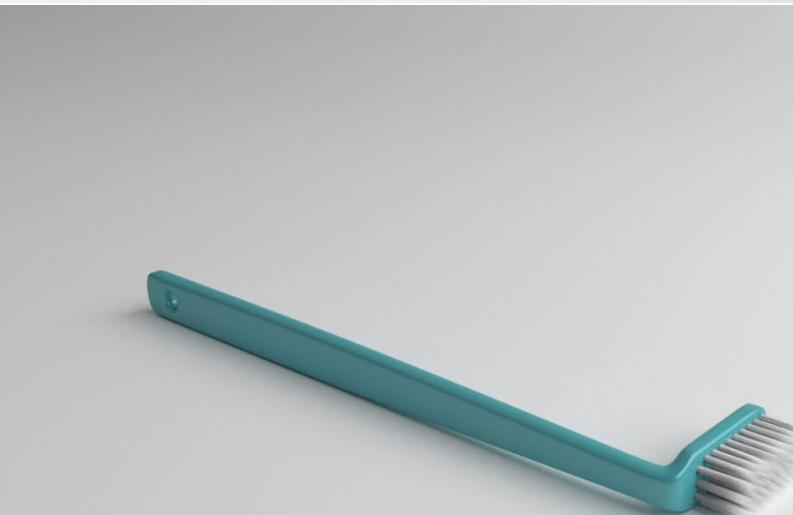
- Dead-man switch
- Medicine bottle cap
- Reminder to save your file
 - Difficulty in games



GOOD/BAD DESIGN

How to

- Hide critical components: make things invisible.
- Use unnatural mappings for the execution side of the action cycle, so that the relationship of the controls to the things being controlled is inappropriate or haphazard.
- Make the actions physically difficult to do.
- Require precise timing and physical manipulation.
- Do not give any feedback.



GOOD/BAD DESIGN

Defensive Design



Public Bench

GOOD/BAD DESIGN

Defensive Design



Clamshell Packaging

GOOD/BAD DESIGN

Defensive Design



GOOD/BAD DESIGN

Defensive Design



Camden Benches

GOOD/BAD DESIGN

We're all designers!

DISCOVERABILITY

- Affordance
- Signifiers
- Mapping
- Feedback
- Constraint



DISCOVERABILITY

Discoverability

Ability to figure out what actions are possible and where/how to perform them

DISCOVERABILITY

Underlying Principles

Discoverability results from appropriate application of 5 fundamental psychological concepts

1. Affordance
2. Signifier
3. Mapping
4. Feedback
5. Constraint



AFFORDANCE

Affordance

A relationship between the properties of an object and the capabilities of the person that determine how the object could possibly be used.

- Chair affords sitting
- Chair affords lifting*

Relationship not property



Left – Monobloc Chair
Right – Le Corbusier's Made from Concrete and Steel Rebar

AFFORDANCE

Anti-Affordance

Glass affords transparency. At the same time, it's blocking the passage of most physical objects. As a result, glass affords seeing through and support, but not the passage of air or most physical objects.

The blockage of passage can be considered an anti-affordance



Sou Fujimoto Architects
House NA, Tokyo, 2011

AFFORDANCE

Visible Affordance

Visible affordances provide strong clues to the operations of things.

Perceived affordances help people figure out what actions are possible without the need for labels or instructions



Panic Bar

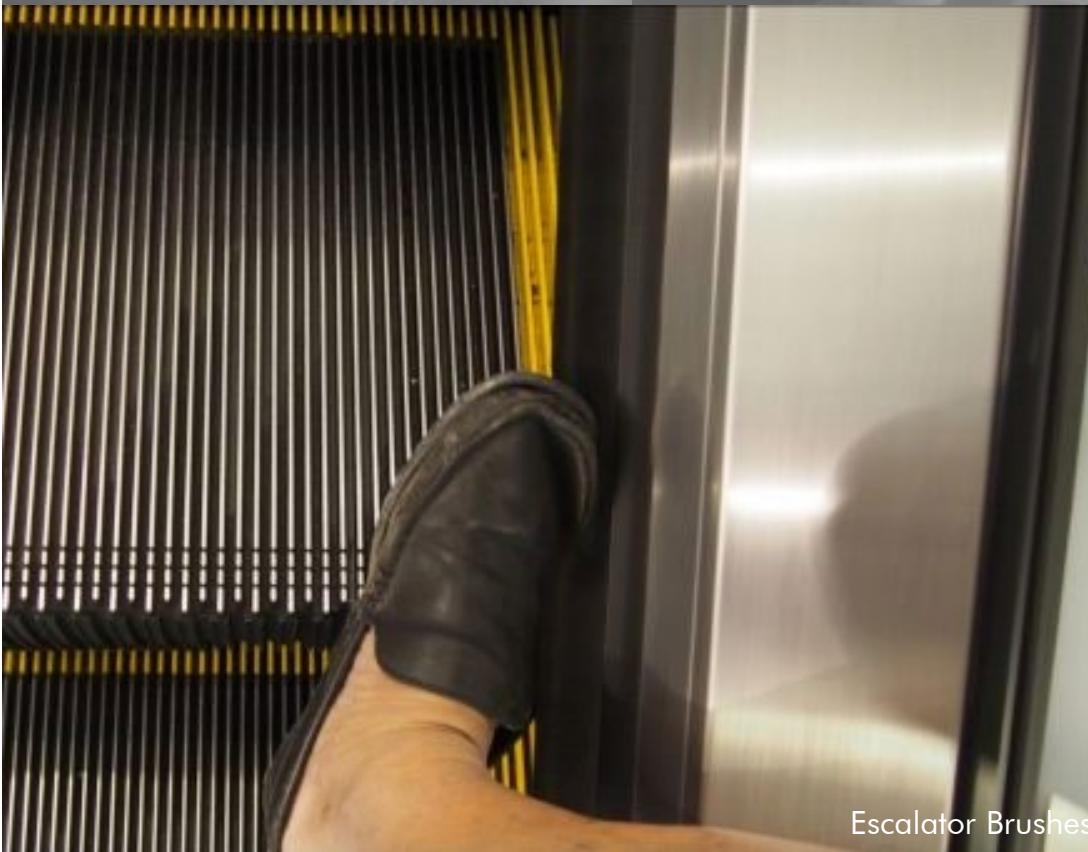
Parking Slots

AFFORDANCE



Discarded Items on top of the railing

Accidental Affordance



Escalator Brushes



Climbing Chest of Drawers

AFFORDANCE

Accidental Affordance



SIGNIFIER

Signifier

Mark or sound, any perceivable indicator that communicates appropriate behavior to the user/person.

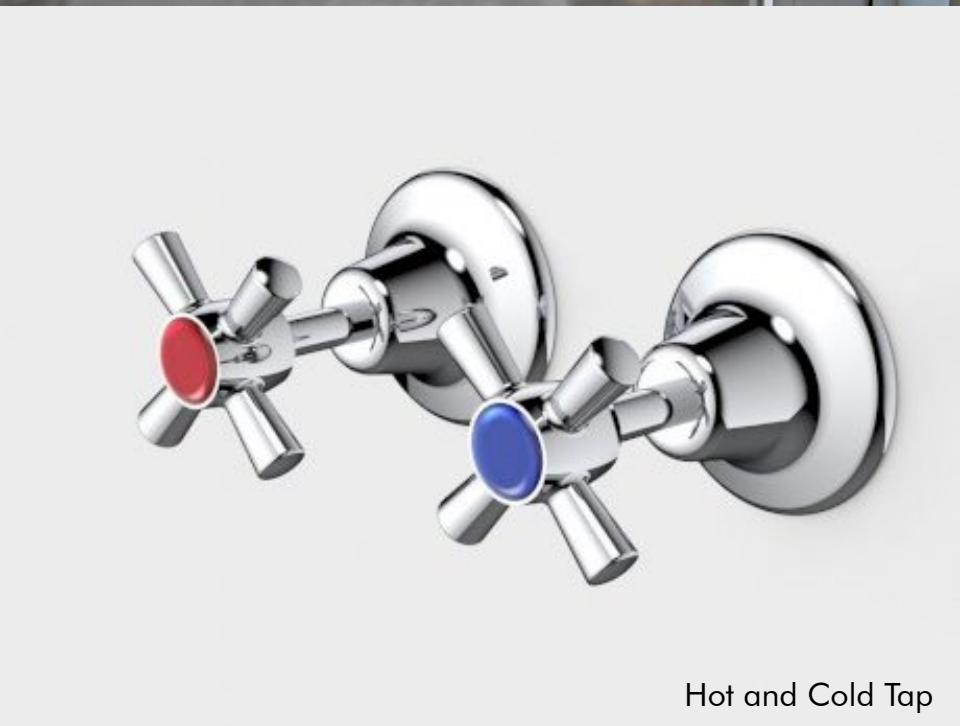
Signifiers can be deliberate and intentional, but they may also be accidental and unintentional.



Push Sign



Walking Trail



Hot and Cold Tap



Surasak BTS Station

SIGNIFIER

Signifier

Signifiers provide valuable clues as to the nature of the world and of social activities.

Signifier is also an important communication device to the recipient, whether or not communication was intended

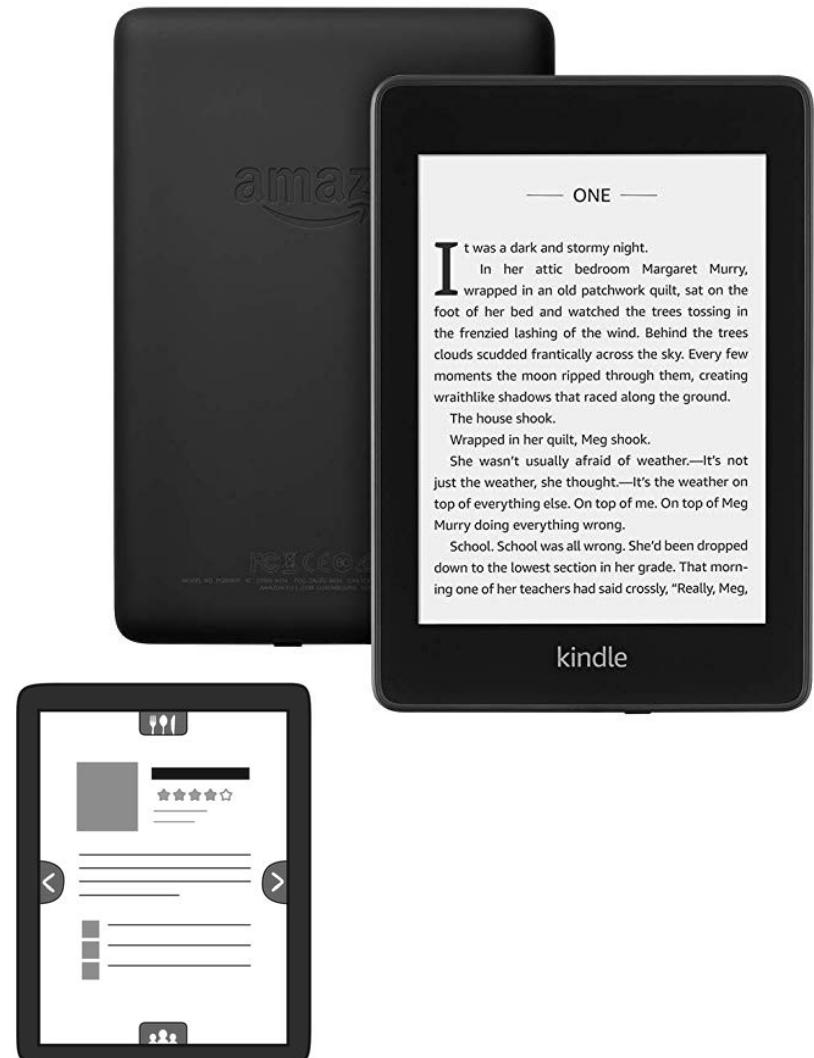
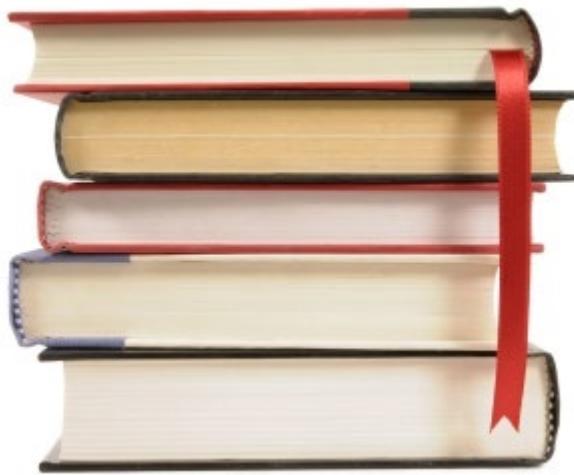
- Double Signifiers



Skyfall, 2012

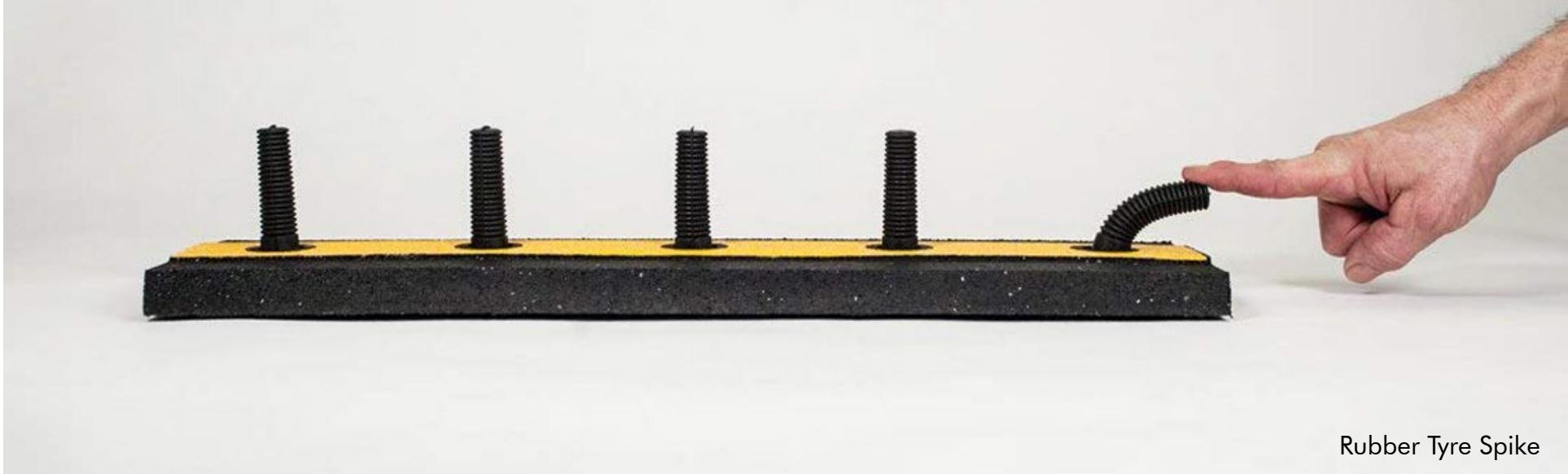
SIGNIFIER

Double Signifiers



SIGNIFIER

Misleading Signifiers

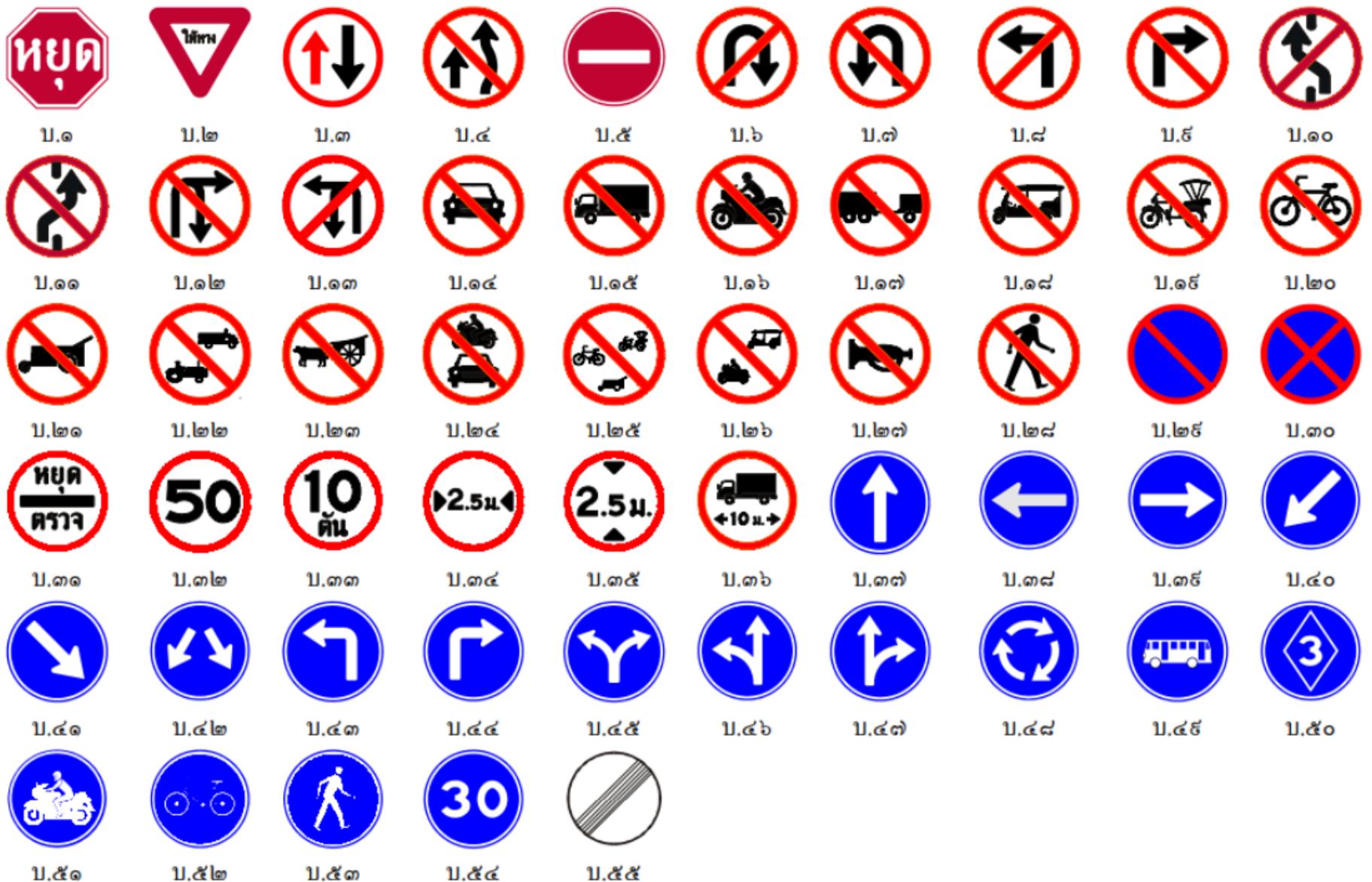


Rubber Tyre Spike

SIGNIFIER

រូបថែទាំ នាំយកចំណាំ

Symbols





เลี้ยวซ้าย
รอสัญญาณไฟ

ถ้าโคนนีบแต่ไม่แล้วก็คงว่าไปได้



เลี้ยวซ้าย
ผ่านตลอด



SIGNIFIER

Original



Symbols



SIGNIFIER

Original



Machine Wash



Machine Wash
Perm Press



Machine Wash
Delicate



Machine Wash
at or below 95°C



Machine Wash
at or below 70°C



Machine Wash
at or below 60°C



Machine Wash
at or below 50°C
Perm Press



Machine Wash
at or below 40°C
Delicate



Machine Wash
at or below 30°C



Do Not Wash



Hand Wash



Bleach



Do Not Bleach



Non-Chlorine
Bleach



Natural Dry



Line Drying



Flat Drying in the
Shade



Drip Flat Drying



Tumble Drying



Mild Drying
Processes



Normal Drying
process



Flat Drying



Do Not Tumble
Dry



Iron



Iron At Low
Temperature



Iron At Medium
Temperature



Iron At High
Temperature



Do Not Iron



Dry Clean



Do Not
Dry Clean

Symbols

SIGNIFIER

Redesigned



Machine Wash



Machine Wash
Perm Press



Machine Wash
Delicate



Machine Wash
at or below 95°C



Machine Wash
at or below 70°C



Machine Wash
at or below 60°C



Machine Wash
at or below 50°C
Perm Press



Machine Wash
at or below 40°C
Delicate



Machine Wash
at or below 30°C



Do Not Wash



Hand Wash



Bleach



Do Not Bleach



Non-Chlorine
Bleach



Natural Dry



Line Drying



Flat Drying in the
Shade



Drip Flat Drying



Tumble Drying



Mild Drying
Processes



Normal Drying
process



Flat Drying



Do Not Tumble
Dry



Iron



Iron At Low
Temperature



Iron At Medium
Temperature



Iron At High
Temperature



Do Not Iron



Dry Clean



Do Not
Dry Clean

Symbols

SIGNIFIER

Dangerous

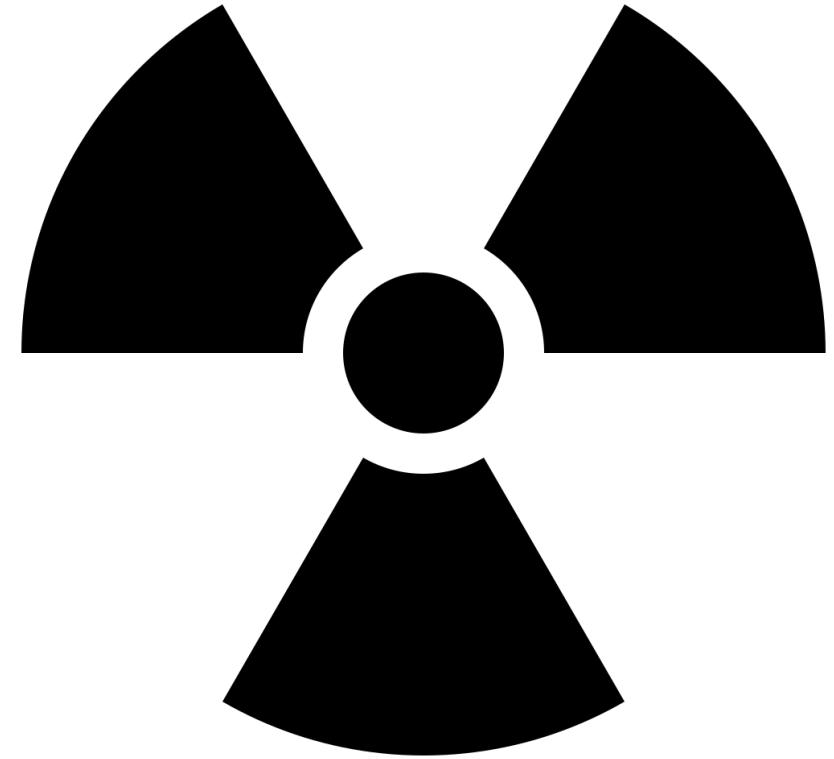


SIGNIFIER

New Symbols



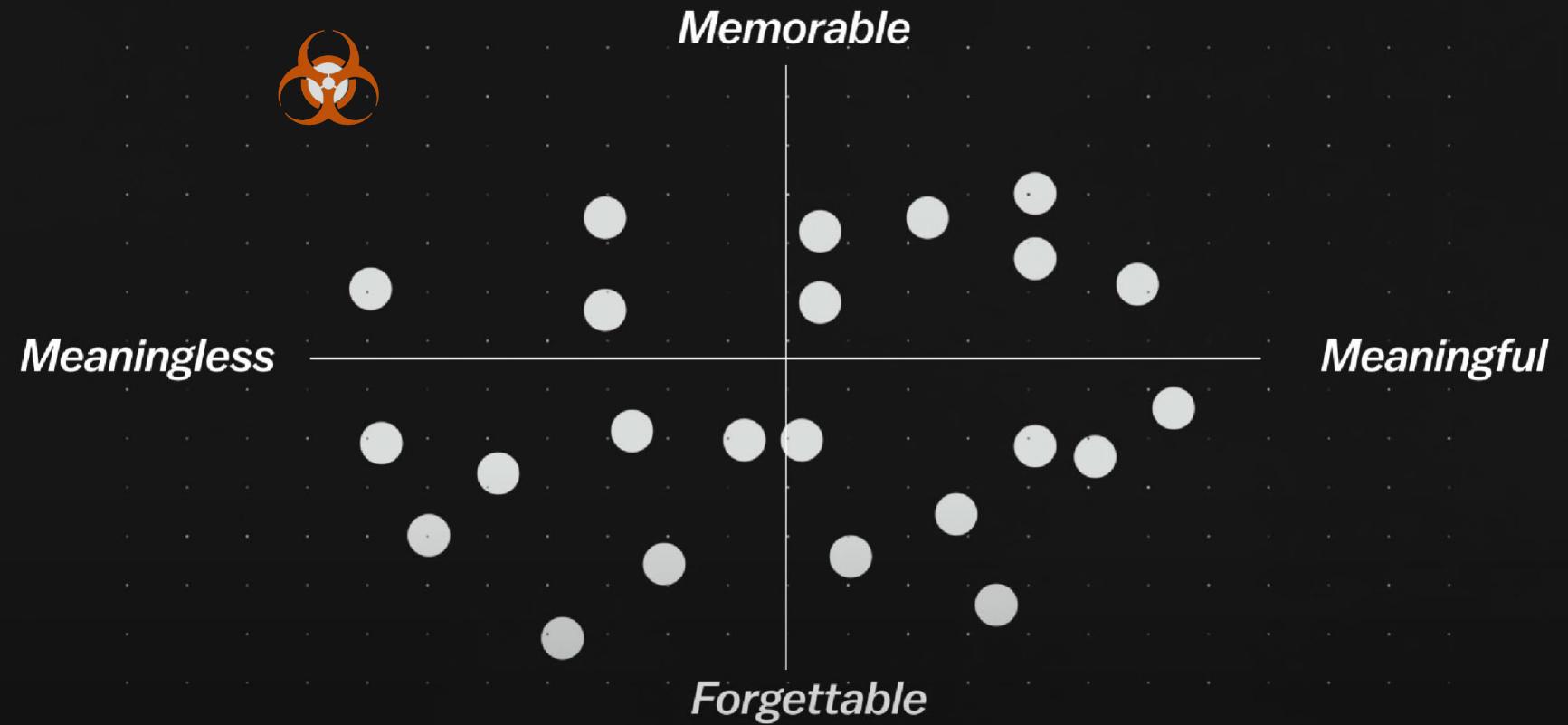
Biohazard



Radiation

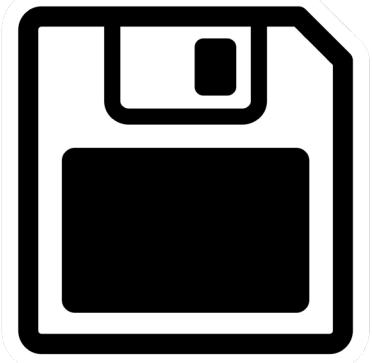
SIGNIFIER

New Symbols



SIGNIFIER

Skeuomorphic Design



SIGNIFIER

Skeuomorphic Design

The act of incorporating old, familiar ideas into new technologies, even though they no longer play a functional role.

'One way of overcoming the fear of the new is to make it look like the old'



MAPPING

Mapping

Spatial correspondence
between the layout of the
controls and the devices being
controlled.

- Good mapping is easy to understand and intuitive.

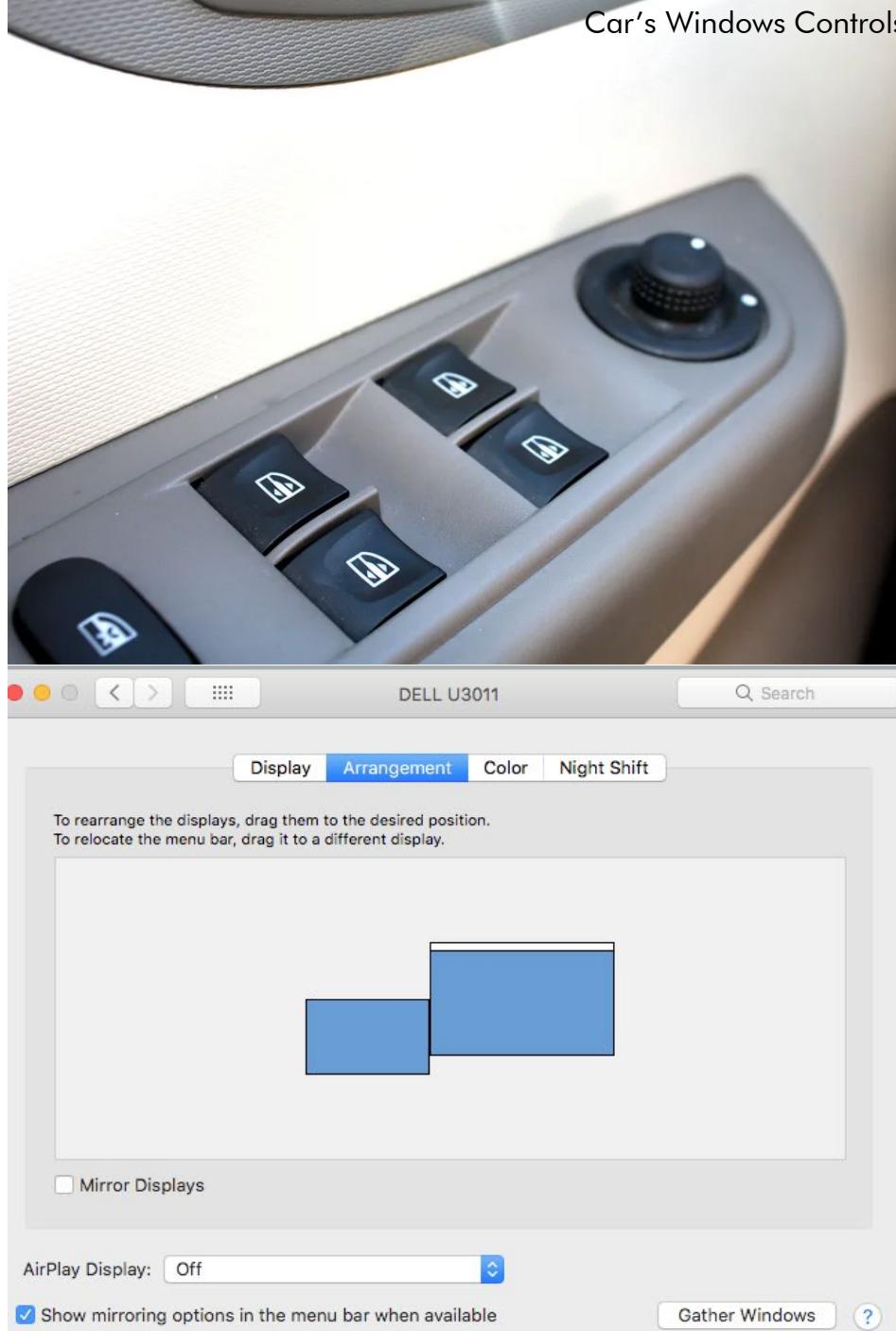


Tesla Model 3 Interior

MAPPING

Natural Mappings

- Taking advantage of spatial analogies, leads to immediate understanding
- Groupings and proximity
- Controls should be close to the item being controlled.



Car's Windows Controls

Mercedes Benz Seat Control



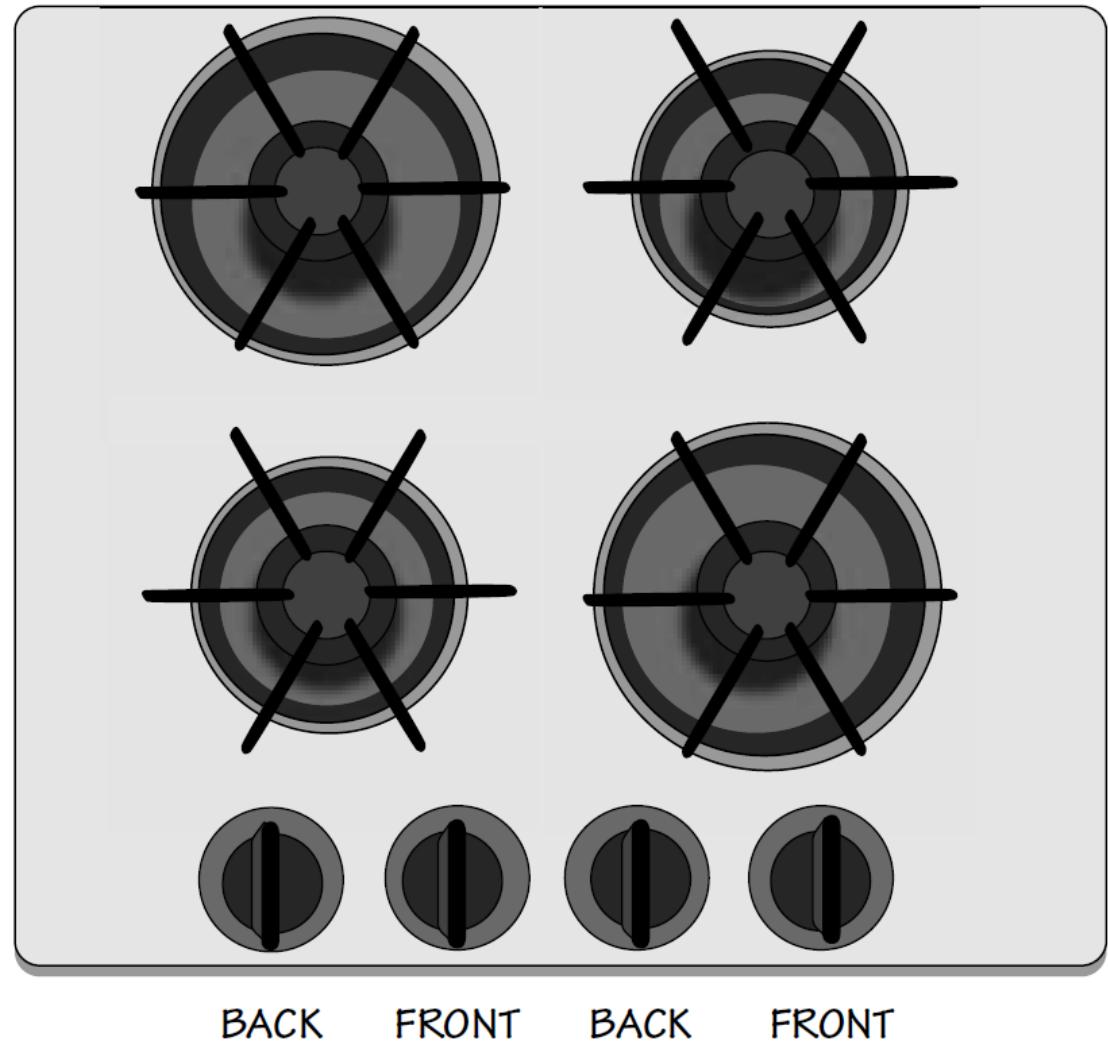
OSX Displays Control

MAPPING

What is wrong with this mapping?

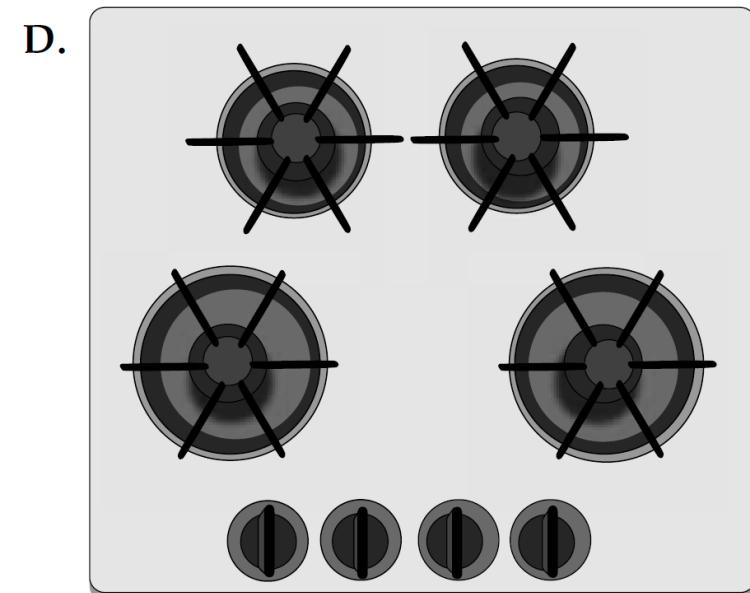
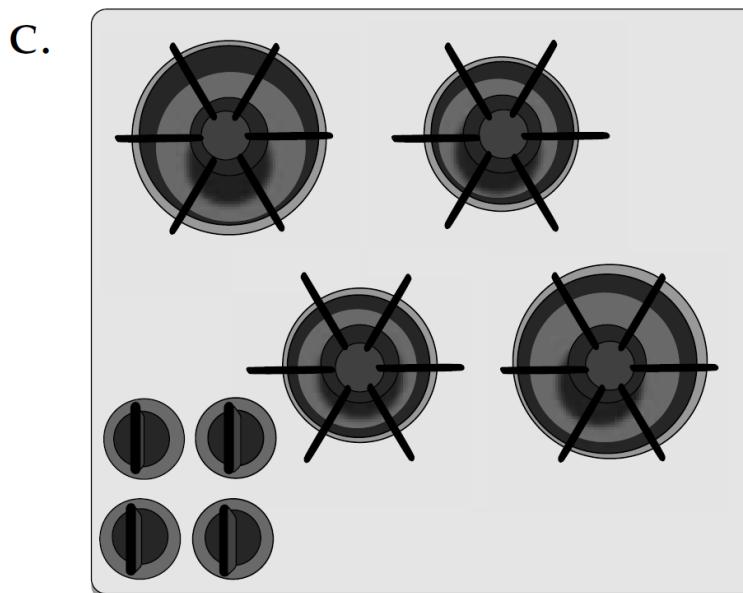
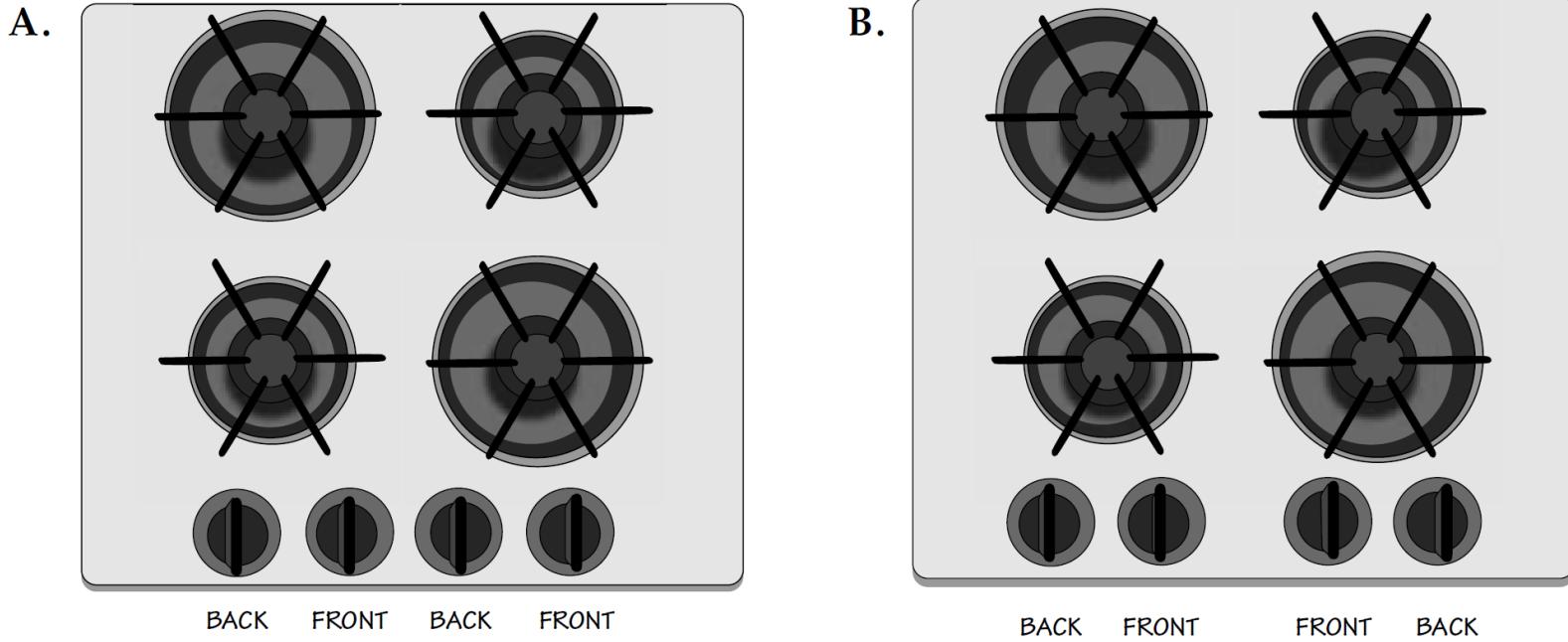
Can you improve this mapping?

A.



MAPPING

Possible Mappings



MAPPING

- **Best Mapping**

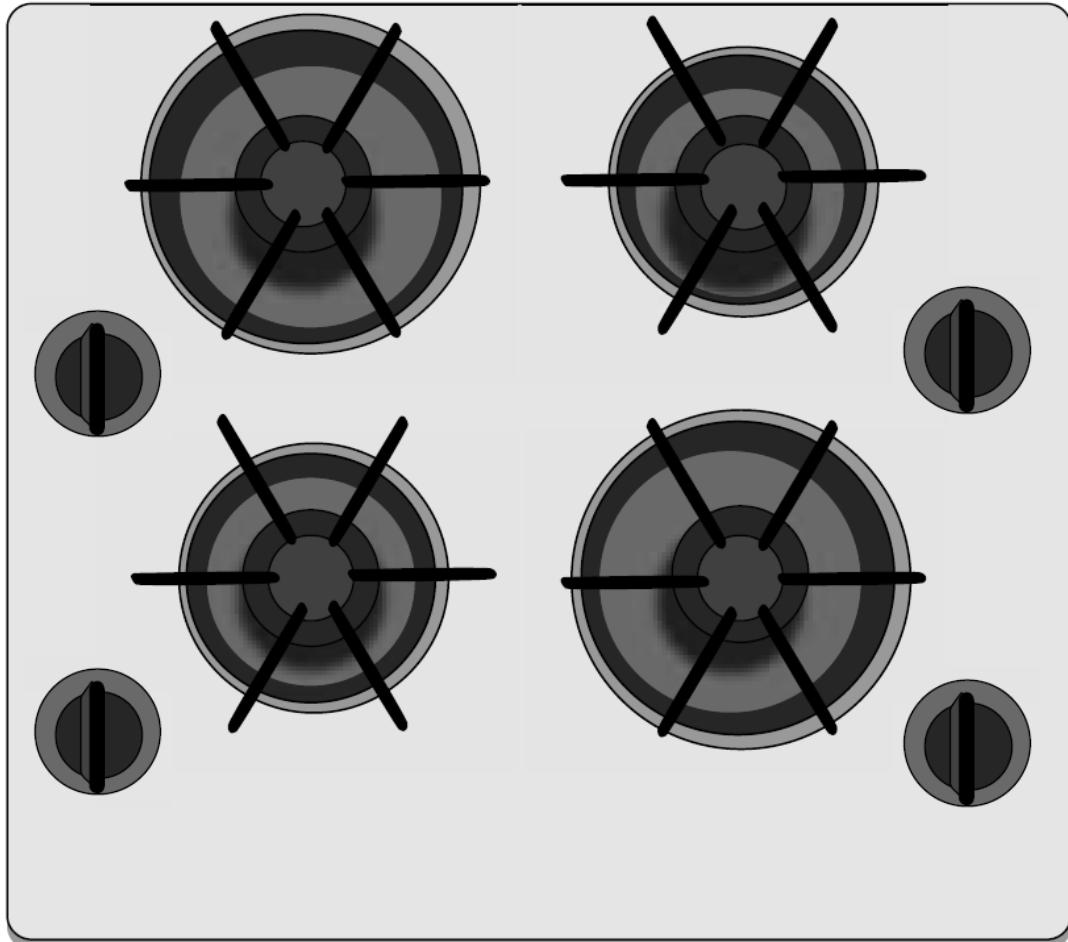
Controls are mounted directly on the item to be controlled.

- **Second-best Mapping**

Controls are as close as possible to the object to be controlled.

- **Third-best mapping:**

Controls are arranged in the same spatial configuration as the objects to be controlled.



MAPPING

- **Best Mapping**

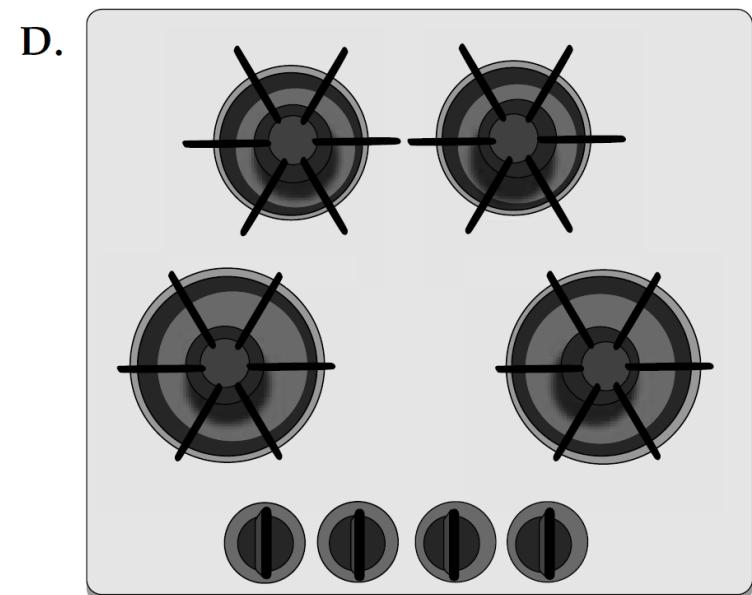
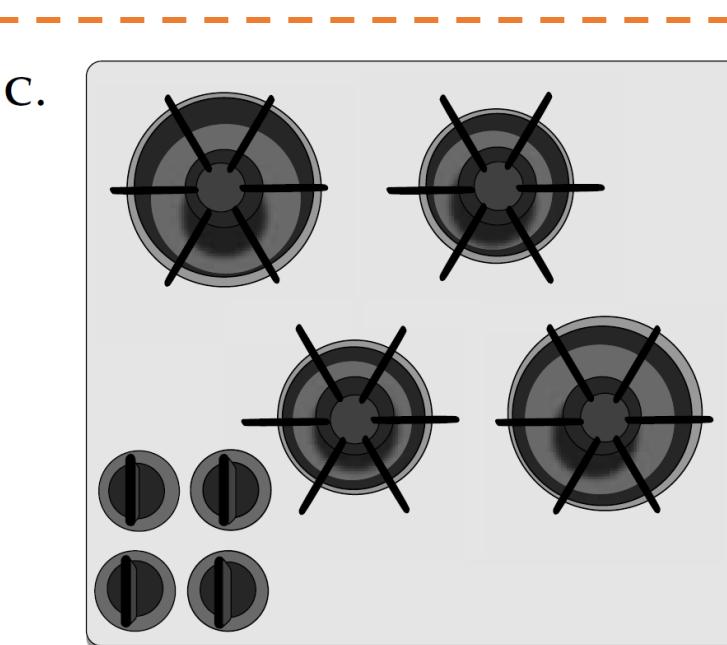
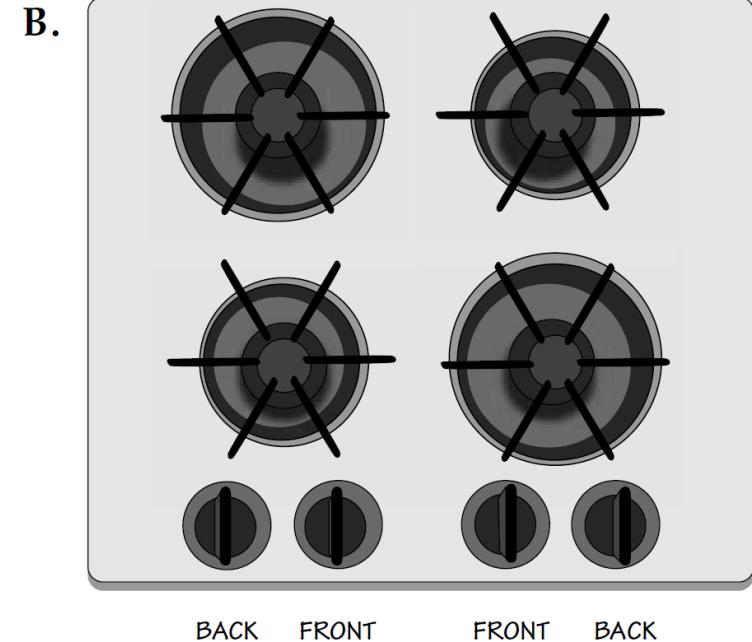
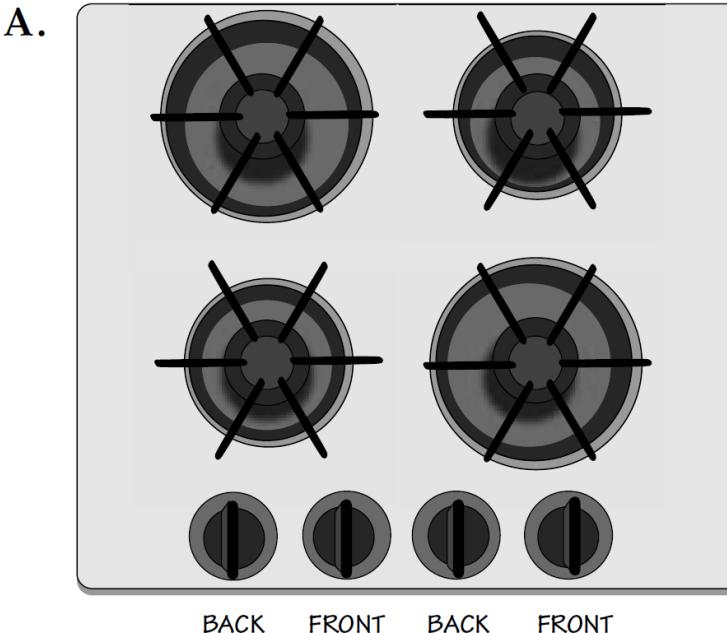
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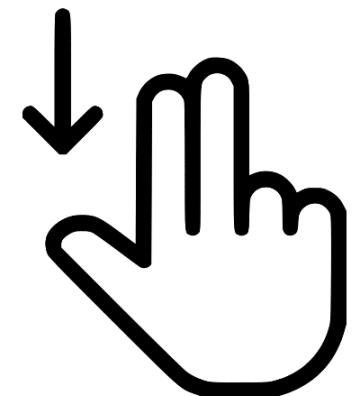
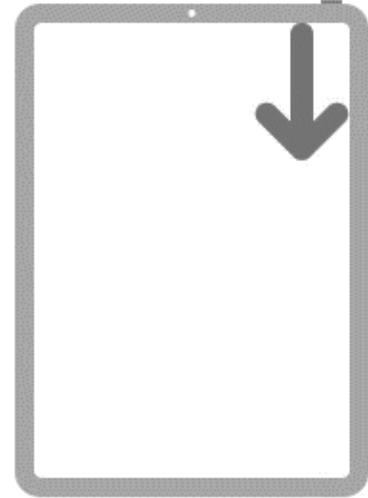
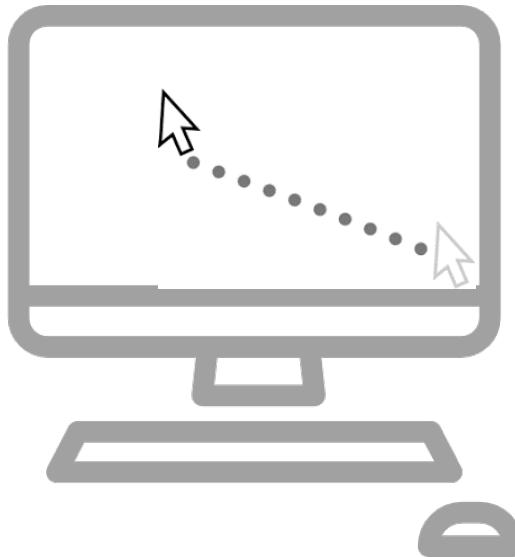
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MAPPING

Switching Mappings

- Moving windows
- VS
- Moving text metaphor



FEEDBACK

Feedback

Communicating the results of an action

- Touch
- Visual
- Audio



FEEDBACK

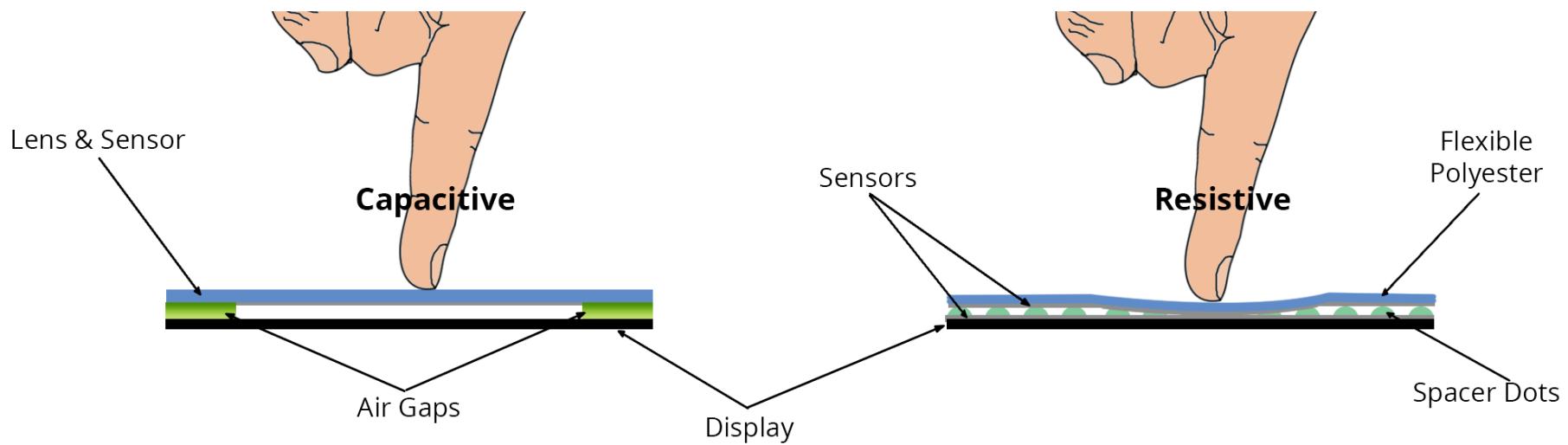
- **Feedback must be immediate**; even a delay of a tenth of a second can be disconcerting.
- **Poor feedback can be worse than no feedback at all**, because it is distracting, uninformative, and in many cases irritating and anxiety-provoking.



Resistive Touch Screen

FEEDBACK

- **Feedback must be immediate**; even a delay of a tenth of a second can be disconcerting.
- **Poor feedback can be worse than no feedback at all**, because it is distracting, uninformative, and in many cases irritating and anxiety-provoking.



FEEDBACK

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- **Poor feedback can be worse than no feedback at all**, because it is distracting, uninformative, and in many cases irritating and anxiety-provoking.



Unresponsive Computer

FEEDBACK

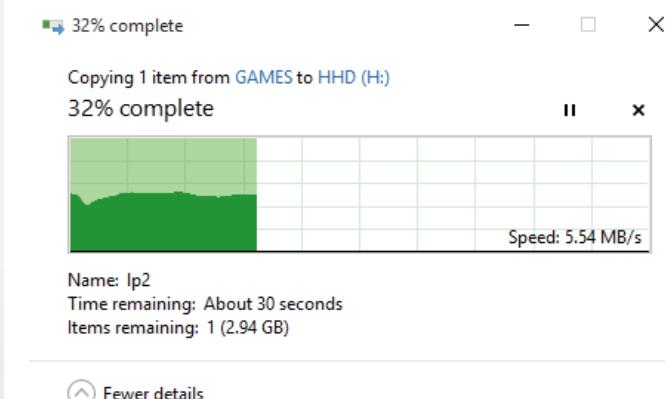
- However, in certain situations,
**some feedback can be
better than no feedback....**



Lift panel with floor indicator



Traffic stop with digits indicator



Copying progress vs Spinning colors wheel

FEEDBACK

Feedback Overload

- Too much feedback can be even more annoying than too little.
- **Moderation / Subtleness**



Literal Back-seat Driver

CONSTRAINT

Constraints

Constraints are **clues**, limiting the set of possible actions.

Constraints in design lets people determine the proper course of action, even in a novel situation.

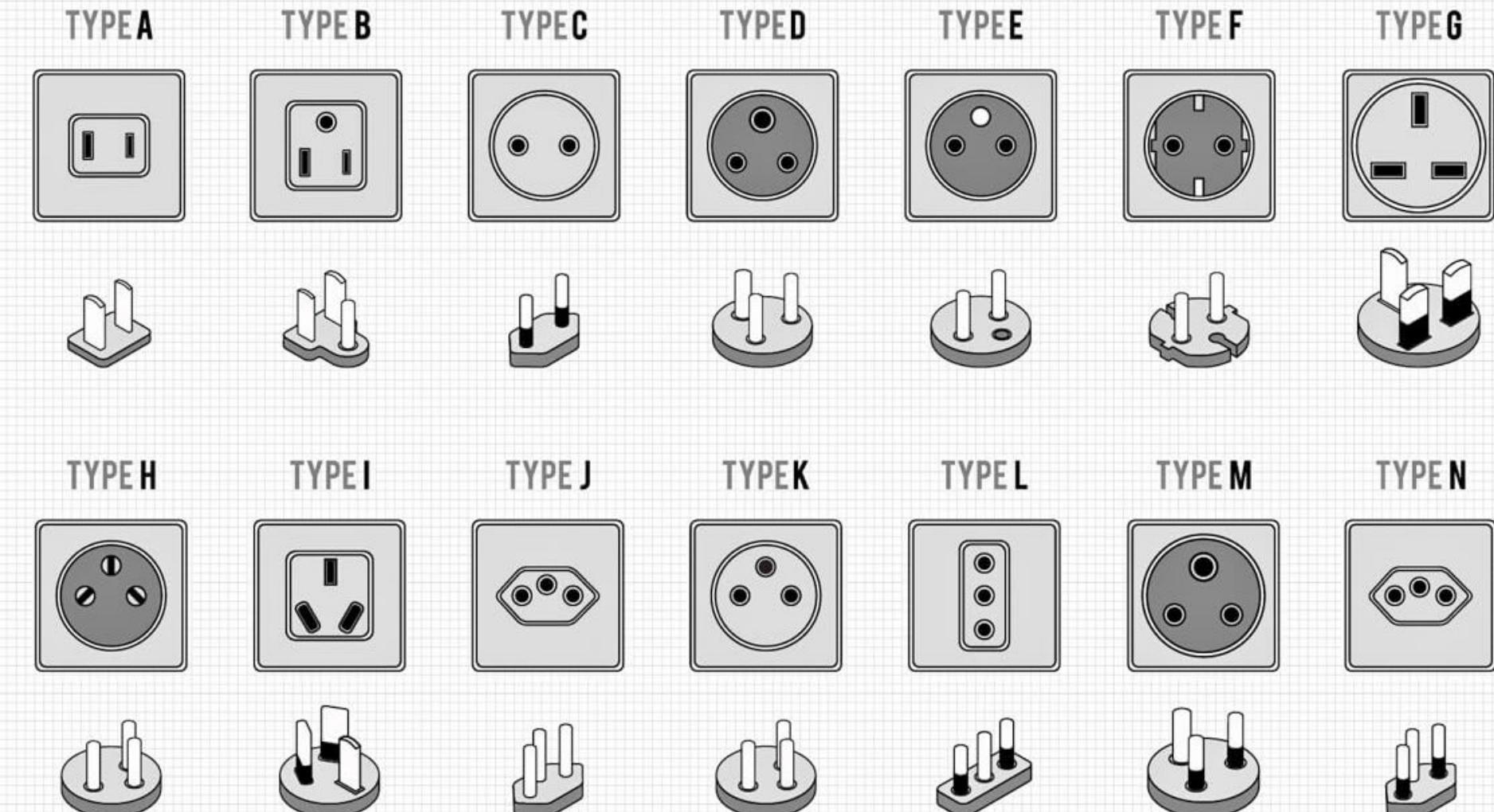


CONSTRAINT

Physical Constraint

Physical limitations which constrain possible operations

Physical constraints are made more effective and useful if they are easy to see and interpret, for then the set of actions is restricted before anything has been done

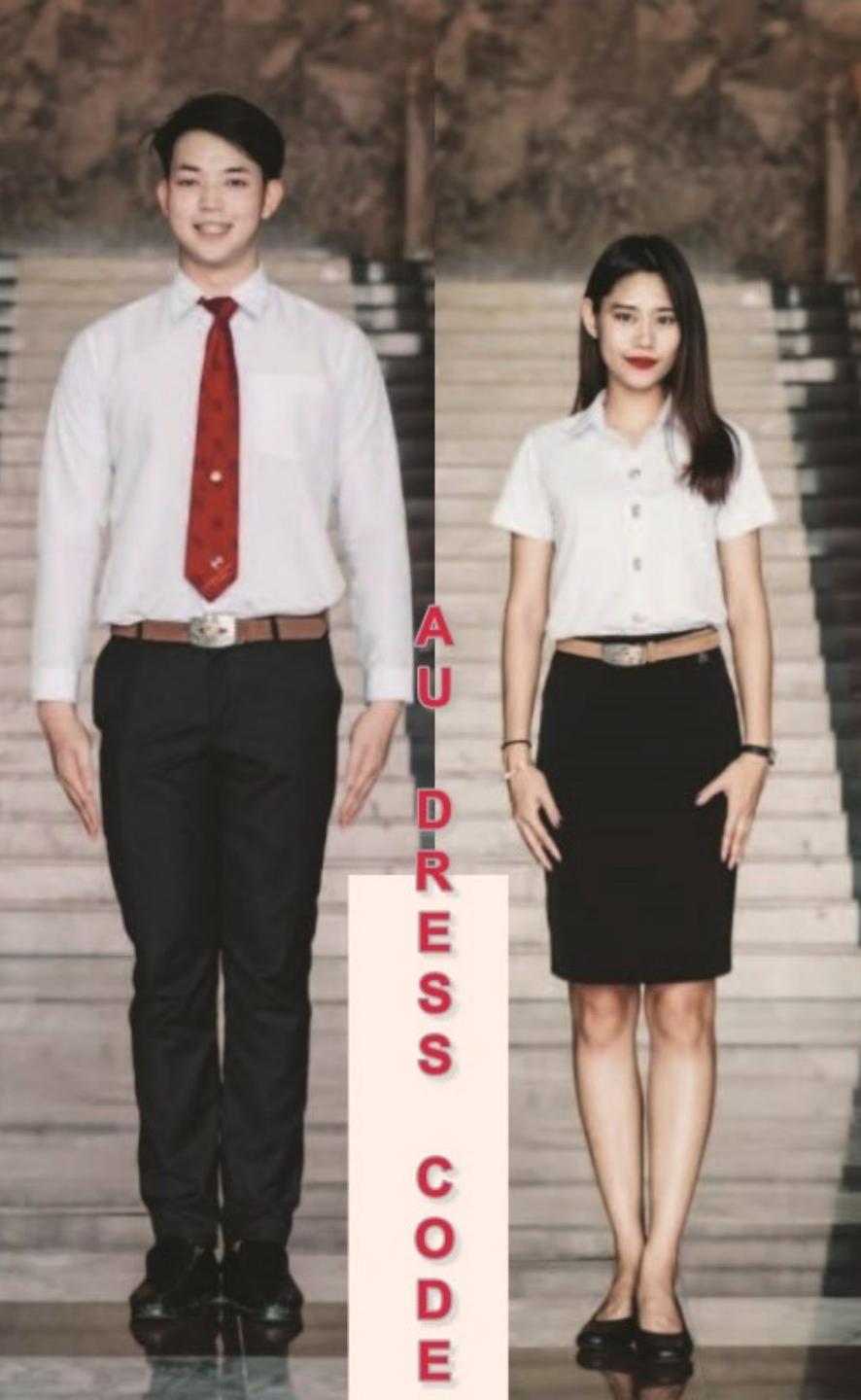


CONSTRAINT

Physical Constraint

Physical limitations which constrain possible operations

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WAI KRU CEREMONY DRESS CODE

UNIVERSITY PIN

UNIVERSITY BUTTON

UNIVERSITY BUCKLE

ABOUT KNEE LENGTH

PLAIN BLACK SHOES

UNIVERSITY PIN

UNIVERSITY TIE

UNIVERSITY BUCKLE

(NO SKINNY)
BLACK TROUSERS

PLAIN BLACK SHOES

SEPTEMBER 7, 2017

JOHN PAUL II SPORTS CENTER
SUVARNABHUMI CAMPUS

Alusco
UNIVERSITY OF ALUSCO
TODAY'S LEARNERS
FUTURE LEADERS

University of Alusco
UNIVERSITY OF ALUSCO
TODAY'S LEARNERS
FUTURE LEADERS

CONSTRAINT

Removing Constraint

- Root-cause Analysis
- Realising the **actual problem**



Left – 30 Pins Connector / USB-A
Middle Top – Lightning Connector
Middle Bottom – USB-C
Right – MagSafe Charger

CONSTRAINT



Removing Constraint

- Root-cause Analysis
- Realising the **actual problem**



CONSTRAINT

Legacy Problem

Why does inelegant design persist for so long?

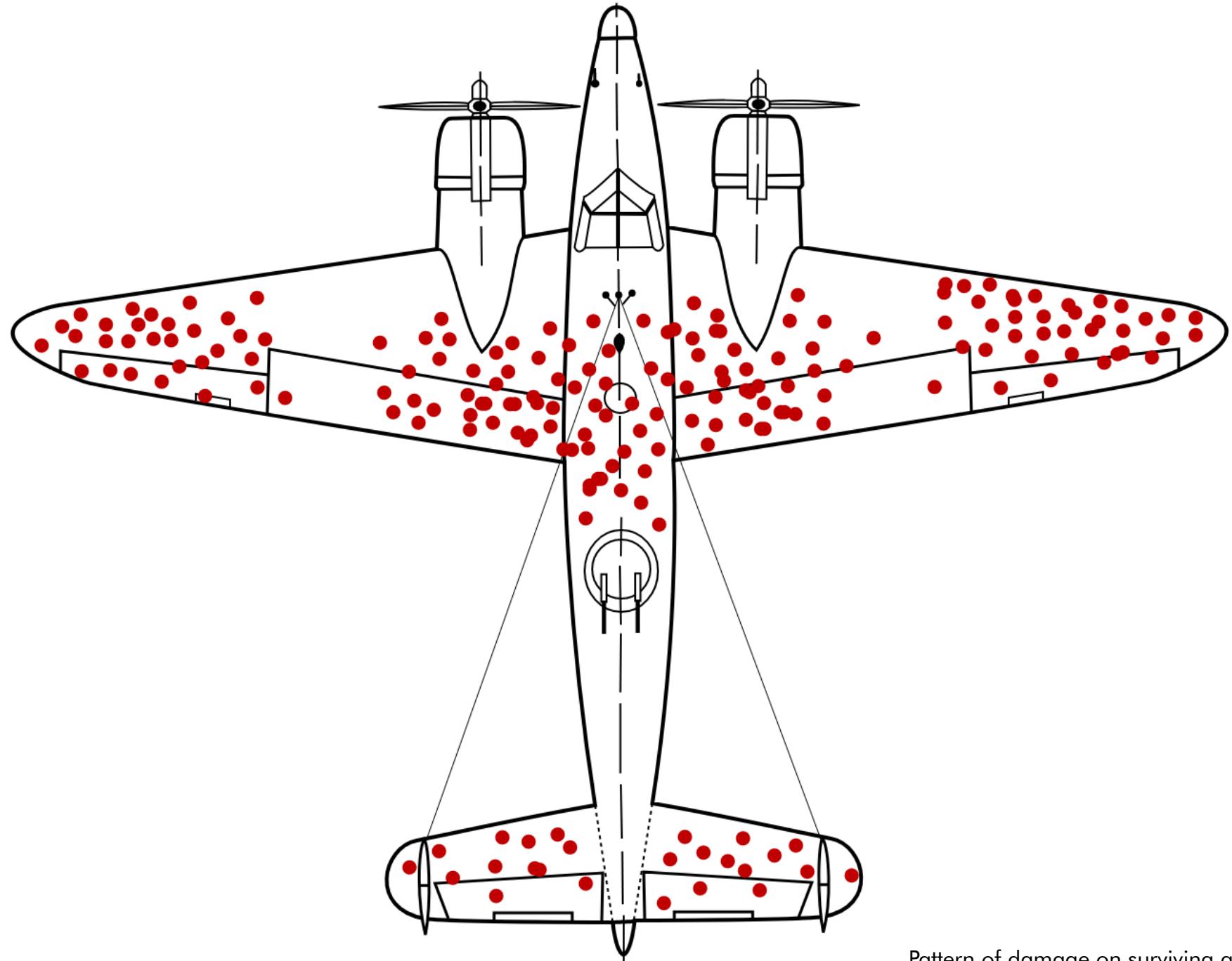


MagSafe 3
Headphone jack
Thunderbolt 4

CONSTRAINT

Survivorship Bias

Logical error of only focusing on **entities that passed a selection process** while overlooking those that did not.



Pattern of damage on surviving aircraft.

CONSTRAINT

Survivorship Bias

- Architecture/Building
- CEOs/Successful People/Actors/Singers
- Start-ups/Success Story

Survival of the Fittest

– Charles Darwin



Parthenon, Athens, Greece



Steve Jobs



Mark Zuckerberg

DISCOVERABILITY

Affordance

Signifiers

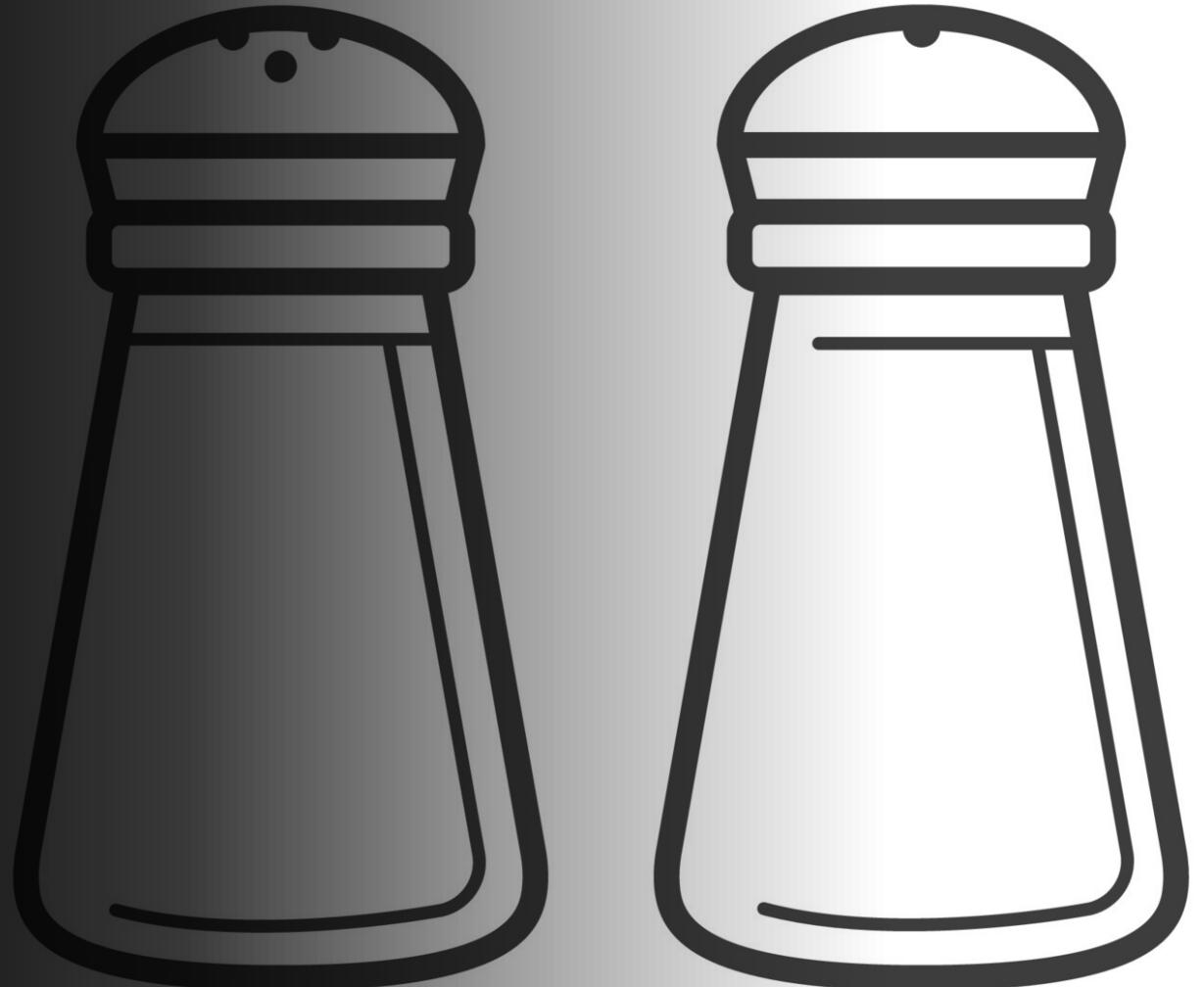
Mapping

Feedback

Constraint

Complexity

- Definitions
- Examples



COMPLEXITY

Why technology is so complex?
Why can't things be simples?

COMPLEXITY

'Life is complex'

COMPLEXITY

Underlying Structure

- System of organisation
- Unravel once understand



Steve Jobs's Table



Boeing 787 Cockpit



Adobe Lightroom Classic CC



Mixing Console

COMPLEXITY

Complexity
vs
Complicated

- Complexity = State of world
- Complicated = State of mind



COMPLEXITY

Complexity

- Complexity is part of the world, but it shouldn't be puzzling
 - But when that complexity is **random and arbitrary**, then we have reason to be annoyed.
- Good design can help **tame the complexity**



Rian Johnson
Knives Out, 2019

COMPLEXITY

Complexity

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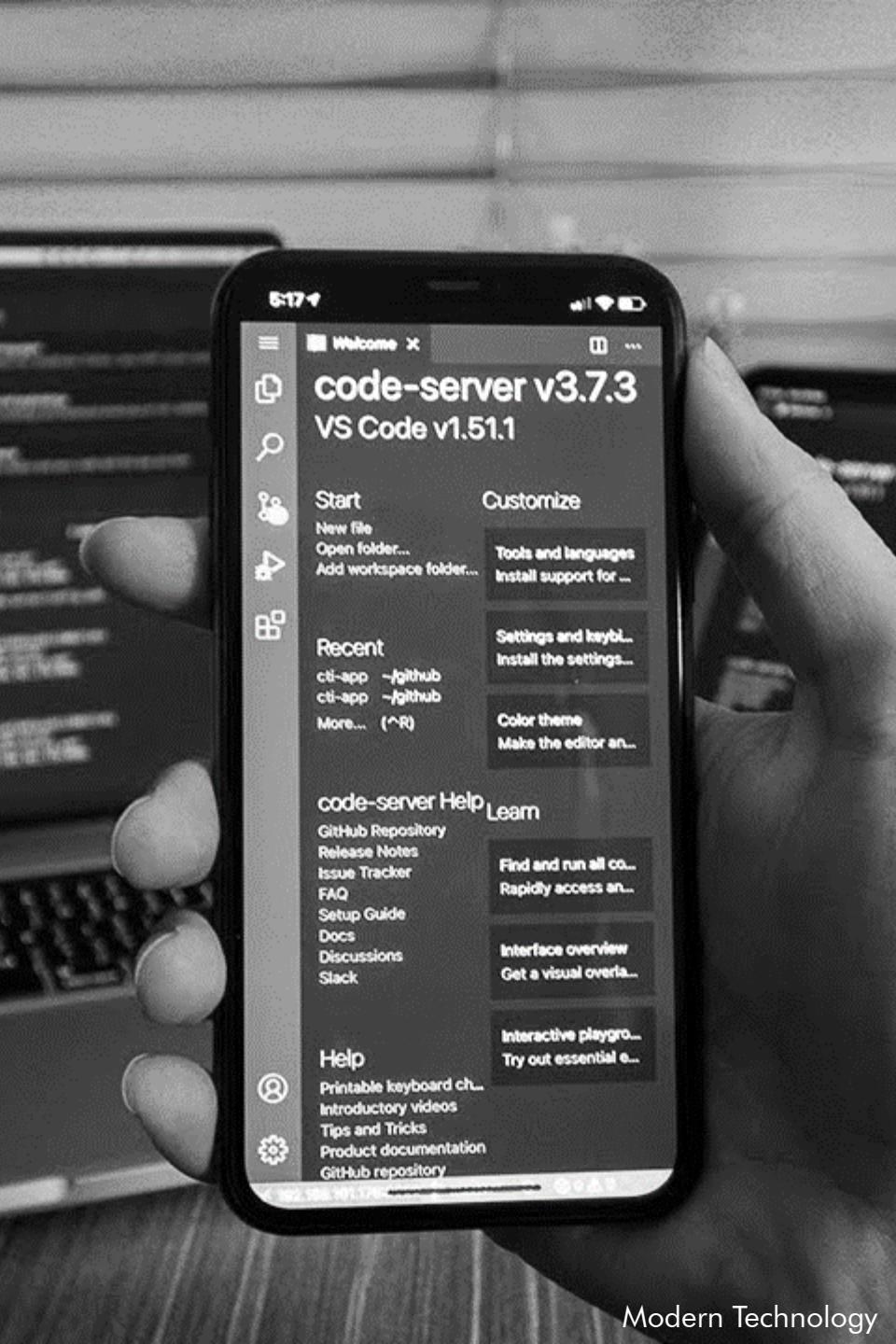


Christopher Nolan
Tenet, 2020

COMPLEXITY

Technology

- Why has the term 'technology' come to refer primarily to items that cause confusion and difficulty
- Simple device/tool is also a technology



Modern Technology



Simple Technology

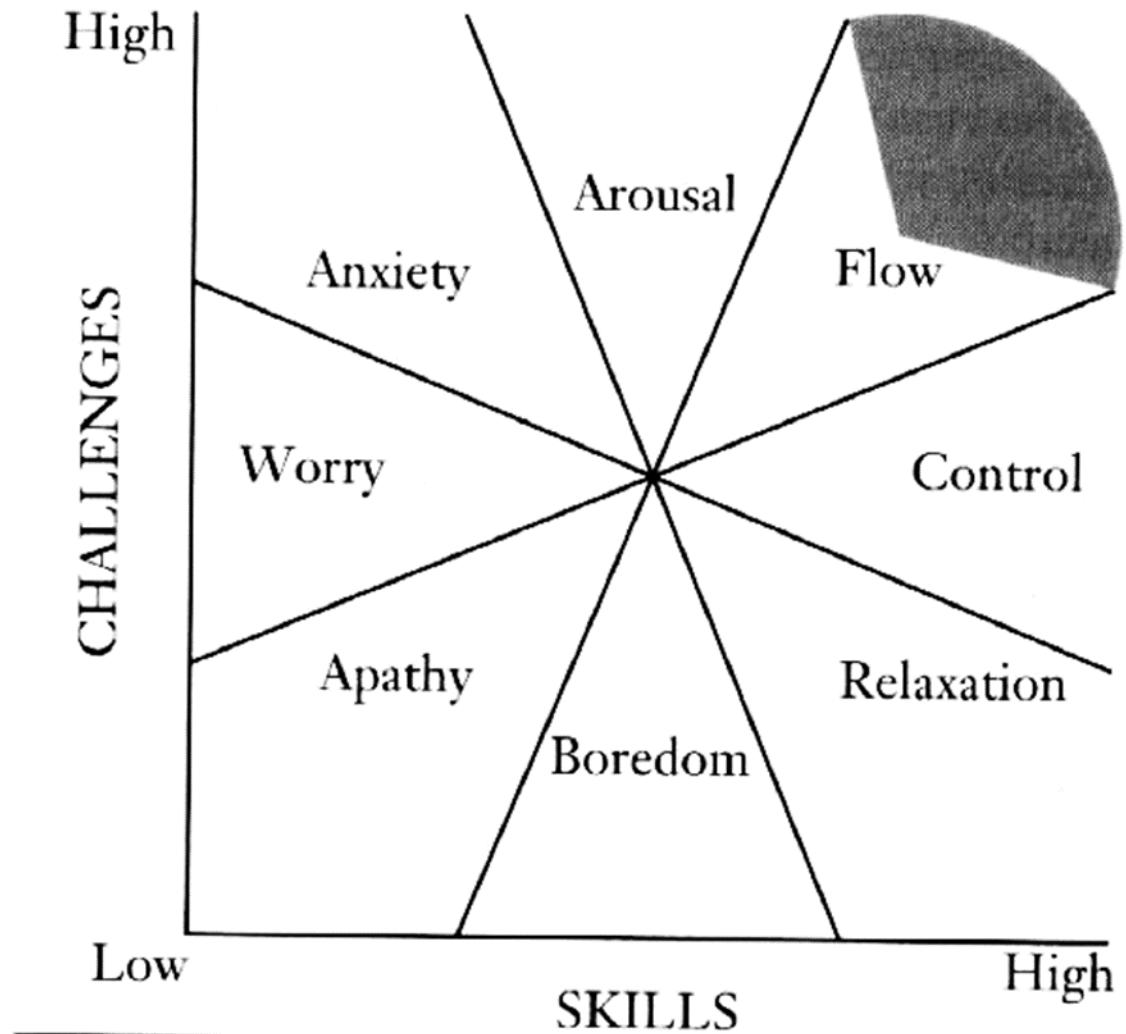
COMPLEXITY

'Medium Complexity'

- Too **simple** = too dull, boring, unenvenful
- Too **complex** = too confusing
- Complexity is a **moving target** depend on the level of expertise and understanding

Figure 1

The quality of experience as a function of the relationship between challenges and skills. Optimal experience, or flow, occurs when both variables are high.



Sources: Adapted from Massimini & Carli 1988; Csikszentmihalyi 1990.

COMPLEXITY

Learning Complexity

ກ	ຂ	ໝ	ຄ	ຕ	໇	ງ	ຈ	ລ	ໜ	໙	ວ	ໝ	ມ
k/k	kh/k	kh	kh/k	kh	kh/k	ng/ng	c/t	ch	ch/t	s/t(s)	ch/t	y/n	d/t
1	2	2	3	3	3	3	1	2	3	3	3	3	1
ຫ	ທ	ດ	ນ	ດ	ດ	ທ	ນ	ນ	ບ	ປ	ພ	ພ	ພ
th/t	th/t	th/t	n/n	d/t	t/t	th/t	th/t	n/n	b/p	p/p	ph/p	f	ph/p
2	3	3	3	1	1	2	3	3	3	1	1	2	3
ຟ	ກ	ນ	ຍ	ຮ	ລ	ວ	ສ	ໜ	ສ	ໜ	ພ	ອ	ສ
f/p(f)	ph/p	m/m	y/y	r/n	l/n	w/w	s/t	s/t	s/t(s)	h	l/n	'	h
3	3	3	3	3	3	3	2	2	2	2	3	1	3

Thai Alphabets



Giant Steps – John Coltrane



Analogue Clock



John Coltrane, 1926-1967

COMPLEXITY

Conceptual Model

- the underlying belief structure held by a person about how something works.
- The files and folders are fictions. There are no files or folders inside the computer.
 - Conceptual models help us transform complex physical reality into workable, understandable mental concept

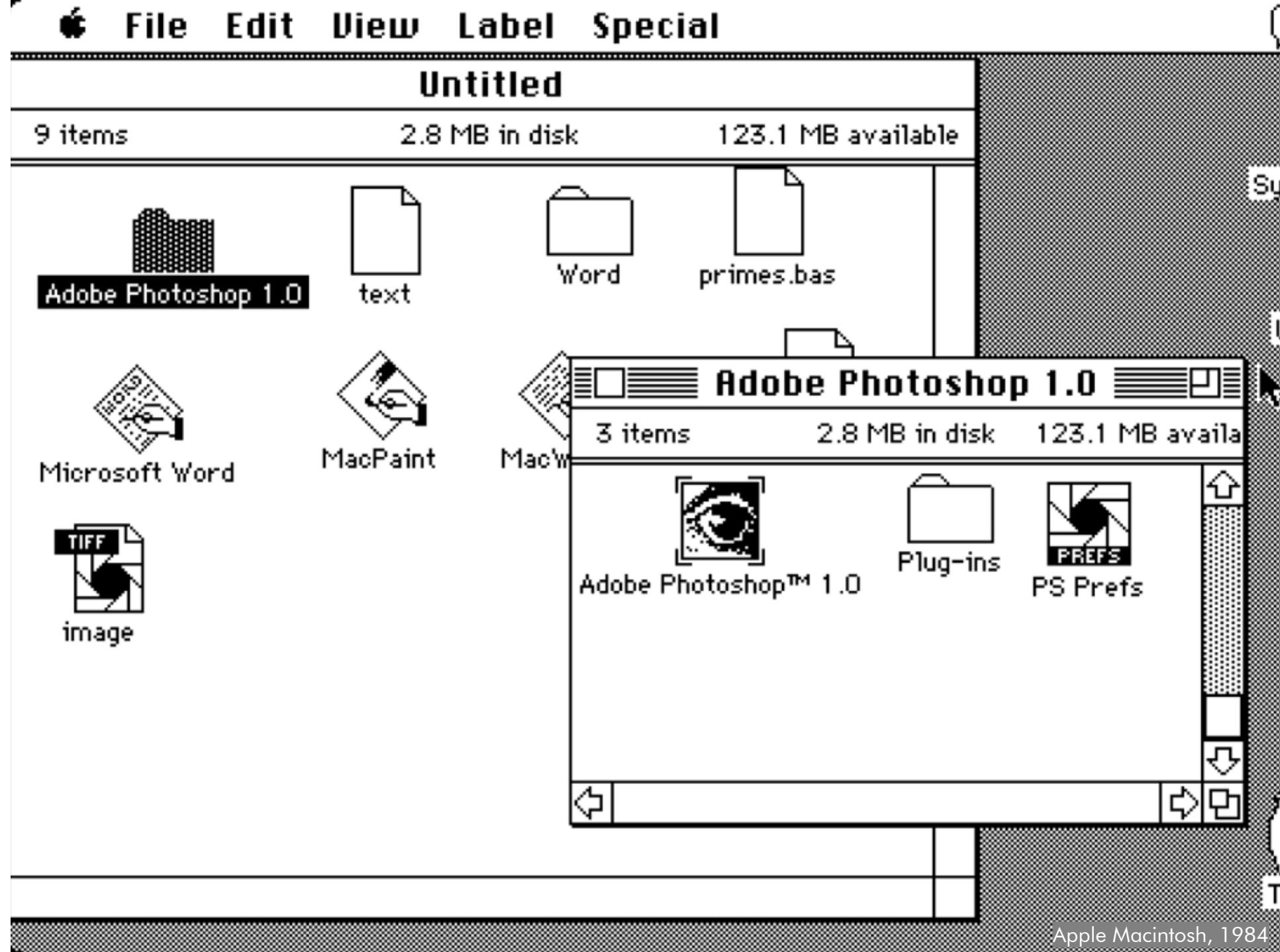
The image is a collage of several screenshots and images related to conceptual modeling:

- A top-left screenshot shows a Windows file explorer window with a sidebar titled "Favorite Links" and a main pane displaying a grid of thumbnail images for files like "salt-pepper-1.jpg", "London Nov 2006-3.JPG", and "ToiletPaper-Fat...".
- To the right of the file explorer is a Microsoft Word document titled "9. Principles of Sociable Design.doc" containing text and images related to the book.
- Below the Word document is a screenshot of a terminal window showing file system navigation and a directory listing for "C:\Users\Bucky\Desktop".
- A large central image shows a perspective view of a filing cabinet with multiple drawers, some open, revealing yellow file folders inside, symbolizing organized data storage or a conceptual model.
- At the bottom right is another terminal window showing a directory listing for "C:\Users\Bucky\Desktop".

COMPLEXITY

Conceptual Model

- the underlying belief structure held by a person about how something works.
- The files and folders are fictions. There are no files or folders inside the computer.
 - Conceptual models help us transform complex physical reality into workable, understandable mental concept



COMPLEXITY

Simplicity Paradox

- The paradox of the quest for simplicity: to make our lives easier, we need more powerful, more complex tools



Swiss Army Knife



Assortment of tools

COMPLEXITY

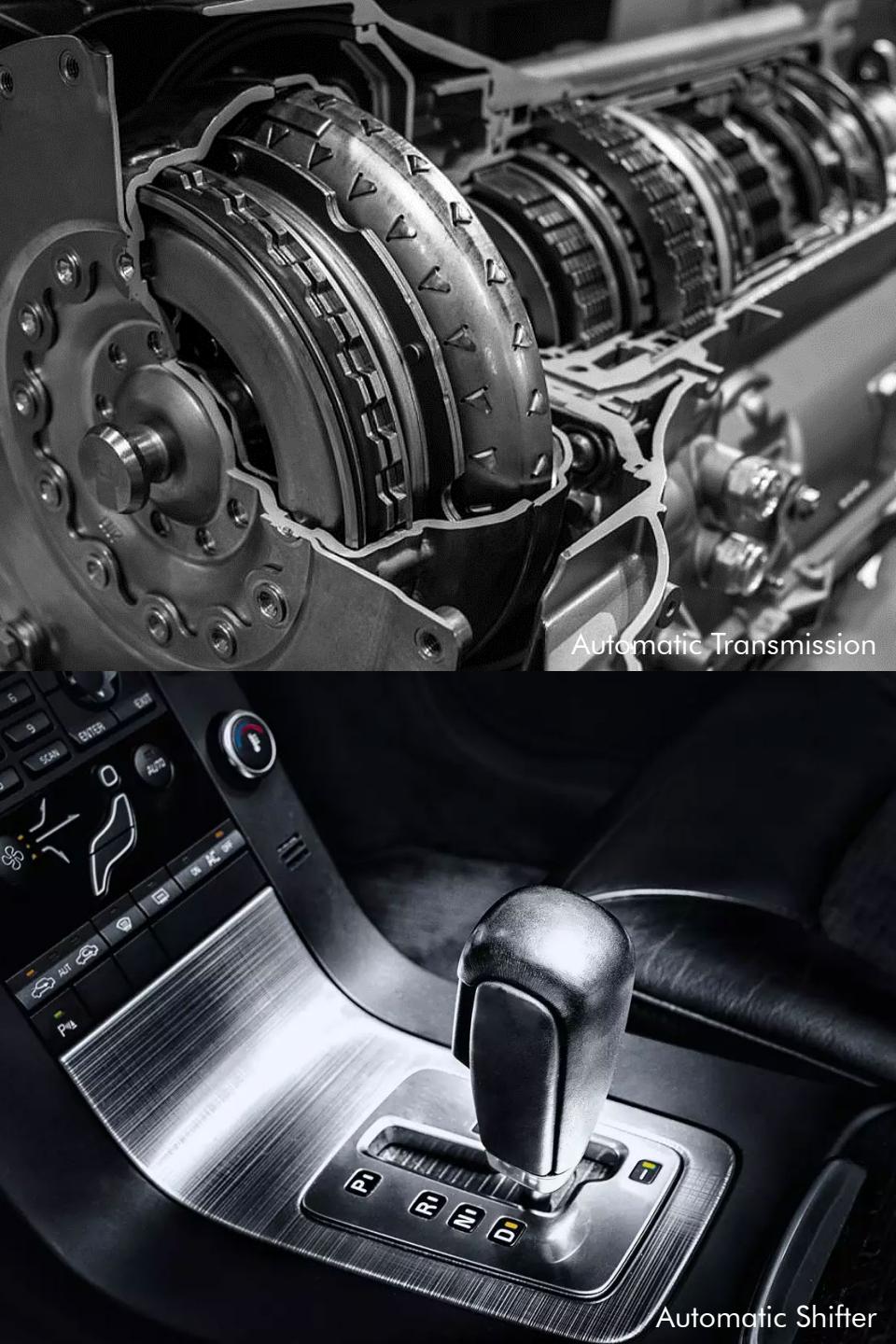
Simplicity Paradox

- Tesler's Law

'Conservation of Complexity'

- As you make the person's **interaction simpler**, the hidden complexity behind the scenes increases.

- Simplicity is a '**point of view**', based on where are we measuring it from.



COMPLEXITY

3M

Simplicity Paradox

- Fewer buttons ≠ Simplicity
- Simple looking device do not always translate to the simplicity of use.



Tesla Model 3 Wiper Control

COMPLEXITY

Simplicity Paradox

- Fewer buttons ≠ Simplicity
- Simple looking device do not always translate to the simplicity of use.



Apple Magic Mouse

COMPLEXITY

Featuritis

- People like features!
- Features and complications indicate status.
- Features create false sense of control, especially during the time of sale/purchase
- Nice looking things with a lot of features!
- Different cultures have different level of featuritis.



DESIGN

More Silly Doors

DESIGN

Honda HR-V



Honda HR-V, 2013
NetCarShow.com

DESIGN

Honda HR-V



Honda HR-V, 2013
NetCarShow.com

DESIGN

Honda HR-V



Honda HR-V, 2013

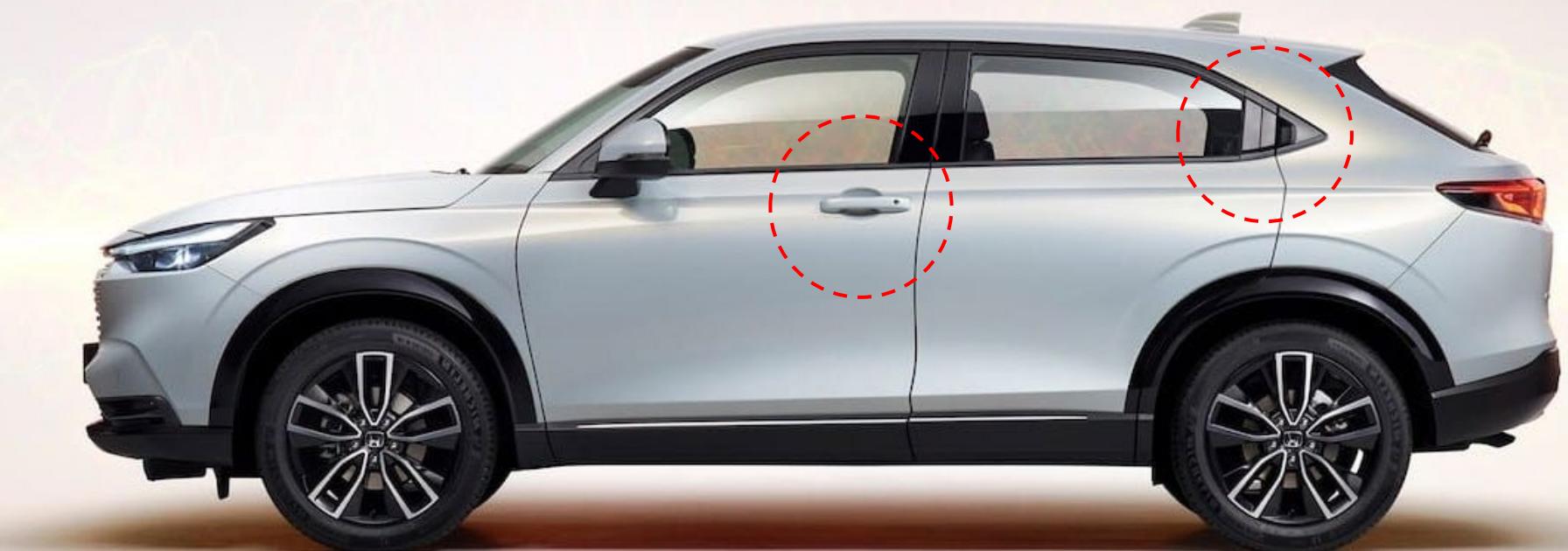
DESIGN

Toyota C-HR



DESIGN

New Honda HR-V



DESIGN

Tesla Model 3

- Hidden Handles
- Aerodynamic



Tesla Model 3, 2017

DESIGN

Tesla Model 3

- Frozen Handles
- Unexpected Consequence



Bad Experience!



DESIGN

Experience Matters!

BREAK

WALLET
EXERCISE

Wallet Exercise

WALLET EXERCISE

Instructions

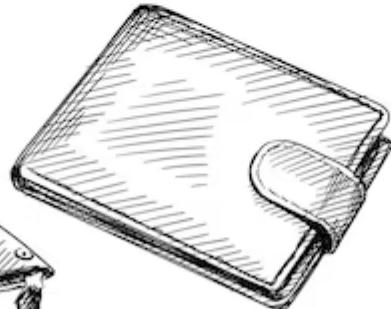
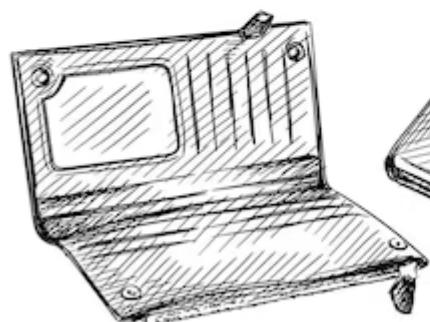
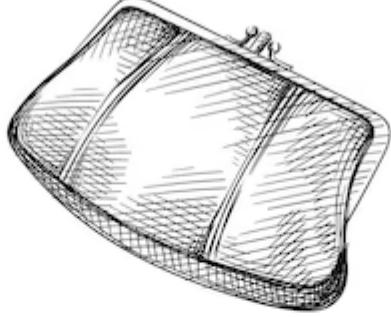
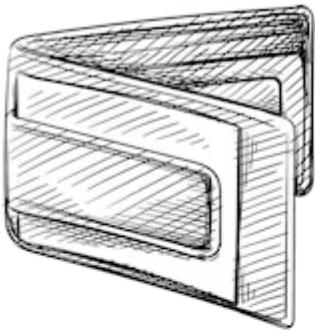
- Pair-up
- Download .pdf of the exercise from Teams



Design the **IDEAL** wallet.

Draw 5min

Sketch your idea here!



Your NEW
mission:

Design something useful and meaningful for your partner.

Start by gaining empathy.

1 Interview

10min (2 sessions x 5 minutes each)

Notes from your first interview

2 Dig deeper

10min (2 sessions x 5 minutes each)

Notes from your second interview



Switch roles & repeat Interview

Switch roles & repeat Interview

Reframe the problem.

3 Capture findings 3min

needs: things they are trying to do*

*use verbs

insights: new learnings about your partner's feelings/
worldview to leverage in your design*

*make inferences from what you heard

4 Define problem statement 3min



name

needs a way to

user's need

Unexpectedly, in his/her world,

insight

Ideate: generate alternatives to test.

5 Sketch 3-5 radical ways to meet your user's needs. 10min



write your problem statement above

6 Share your solutions & capture feedback. 10min (2 sessions x 5 minutes each)

Notes



Switch roles & repeat sharing.

Iterate based on feedback.

7 Reflect & generate a new solution. 3min

Sketch your big idea, note details if necessary!

Build and test.

8 Build your solution.

Make something your partner can interact with!

[not here]

20min



9 Share your solution and get feedback.

+ What worked...

- What could be improved...

? Questions...

! Ideas...

10min (2 sessions x 5 minutes each)

See you next week!