

C-D 001

Introduction to Human-Computer Interaction

Class 2

Submitting reviews

400 words (3-4 paragraphs) of formal writing

First para should be a summary of the article (so we know you have read it)

Rest of it should be your own reactions (can tie to your own experience)

Name the file First_Last_A1.pdf and First_Last_A2.pdf

No late submissions

Assignment 2 (Mark Weiser on Ubicomp) due next Monday before class

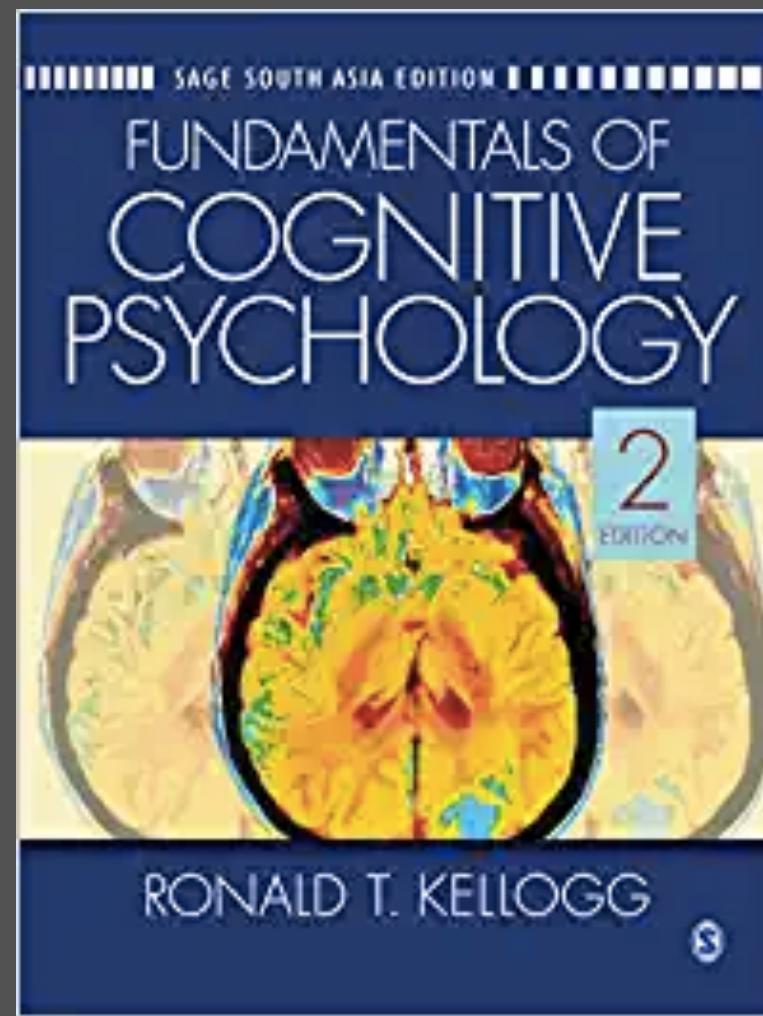
Recap from last class

Course outline

Appreciate the value of the human in the loop

Pioneering projects in the field of HCI

Cognition



What goes on in the mind?



Elements of Cognition

Attention

Perception, recognition

Memory

Learning

Language, reading, listening, etc.

Problem-solving, decision making, ...

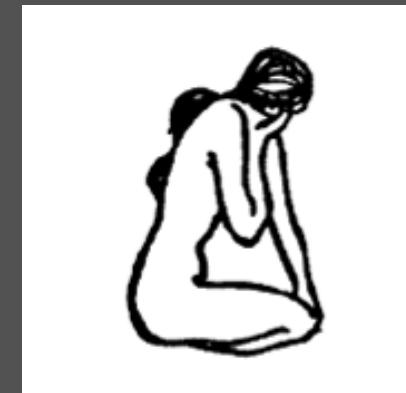
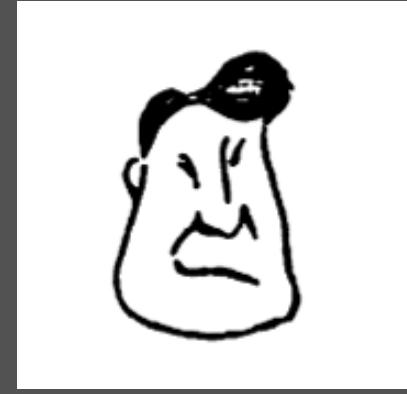
Perception

Perception

rexarxabxy ix is xosxibxe tx rexlaxe exerx thxrd xetxer xf
a xenxenxe wxth xn x xnd xou xtixl cxn mxnaxe tx rex^d
ix wixh sxme xifxicxlty.

Gestalt psychology: We perceive what we expect

Perception



Perception



Perceptions are resistant to change

Perception fixation

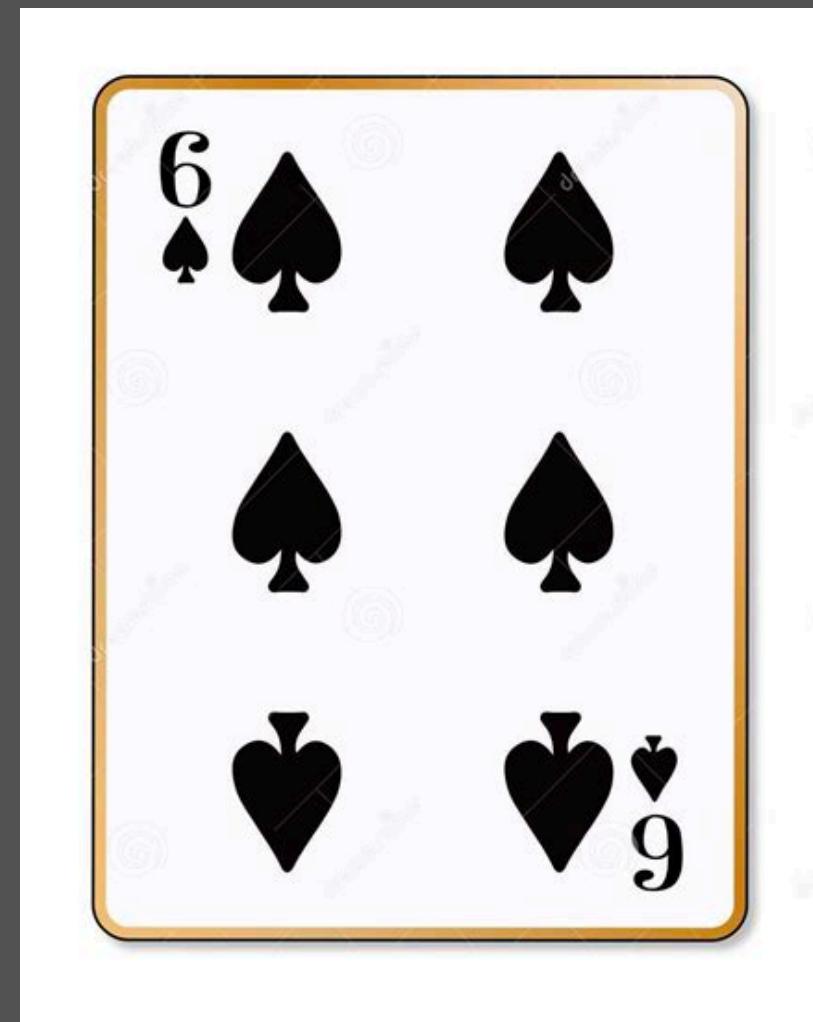
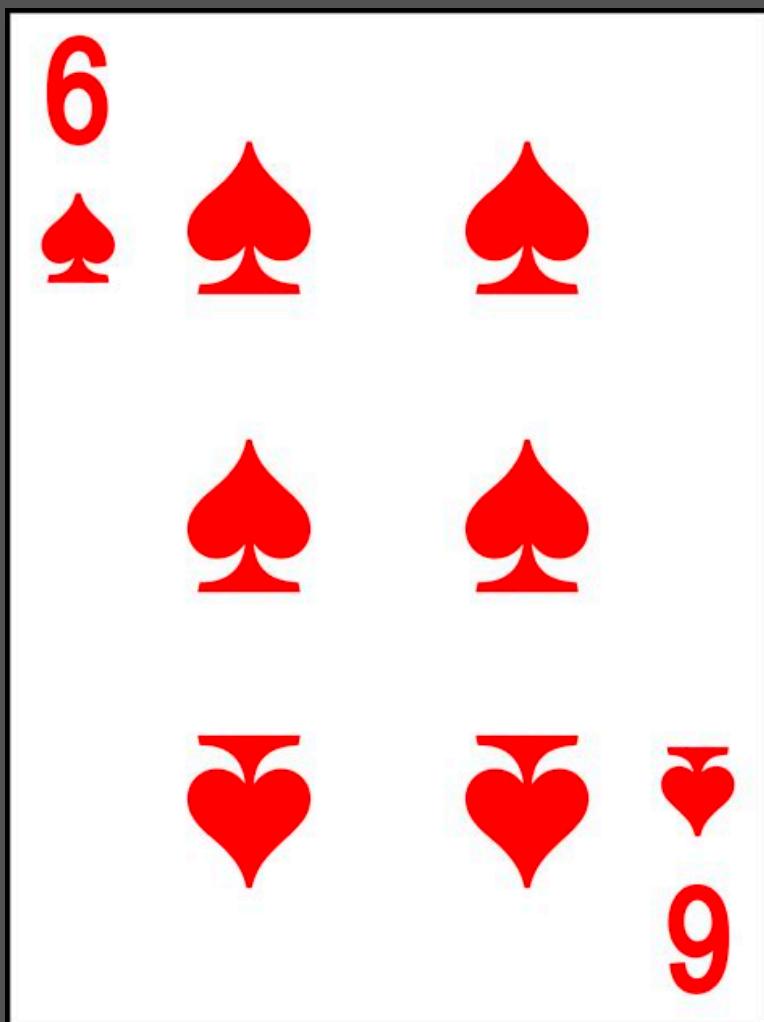
Bruner-Potter experiment showed coloured images of blurred objects like dogs, birds, bricks, slowly coming into focus (1964):

1) At any particular clarity of the image, those who see it for the first time are more likely to recognise the objects correctly than those who started viewing at a less clear stage

(reason: fixation on wrong identification)

2) the longer the exposure, the harder it is to correct impressions

Perceiving incongruities



Perceiving incongruities

Bruner-Postman experiment with playing cards (1949):

Sequences from a set of {4 normal, 6 abnormal cards (suits printed in the opposite color)} shown to participants for increasing durations (3 times at 10ms, then 3 times at 30ms, ... 3 times at 1000ms) until correctly recognized.

The average time of recognition of the abnormal cards is more than 4x greater than for normal cards. In fact 10% of abnormal cards were simply not recognized correctly even after all exposures.

Our brand identity

Summary of elements

Our brand identity is the visual expression of our brand. It includes our logo, colours, typography, imagery and tone of voice used in a clearly defined language that makes us recognized and differentiated from others in the industry.

Always adhere to the brand guidelines for consistency and clarity in representing the brand. Examples of usage are shown in the following pages through our brand applications.



Kepler
Georgia
0123456789
Aa....Zz



Logo +

Colour +

Typography +

Imagery



Tone of Voice

Perception: Implications

Avoid cognitive incongruity

Make interface elements like color, fonts, sounds, etc. predictable and consistent throughout the design

Otherwise leads to higher cognitive load and more time to process

Develop and stick to "brand" guidelines

Perception can be influenced



Perception can be influenced

Influence perception of speed of Mumbai locals

Perception of experience (trailing effects linger), e.g.:

Memories of pain

Progress bars for long operations

Perception can be influenced



Attention



THE TIMES OF INDIA

CELEBRATING GANESH CHATURTHI
*INCLUSIVE OF CHANDIGARH TIMES



PM Modi will launch the new 'Indianised' naval ensign or flag,' doing away with the colonial past', while commissioning an indigenous aircraft carrier as INS Vikrant in Kochi on Friday

Biden admin is preparing to sell \$1.1bn in missiles & radar support to Taiwan, in what will be the largest such transfer in almost 2 years

China's Communist Party will start its 20th Party Congress on Oct 16, an event at which Prez Xi Jinping is expected to be anointed the country's most powerful leader in decades

Abhijit Sen, former Planning Commission member and one of the country's foremost experts on rural economy, dead

KL Rahul will look to regain form as India take on Hong Kong in the Asia Cup today. Meanwhile, Afghanistan defeated Bangladesh by 7 wickets



Sunil Prasad
Bengaluru logged 162.1mm of rain in 24 hours, its highest single-day August rainfall since 1890, flooding the city | **P 10**

Adani world's 3rd richest, 1st Asian to enter top three

In a little over two and a half years, Gautam Adani's wealth has galloped over 13 times. In January 2020, his net worth was about \$10 billion. On Tuesday, he became the third richest person in the world with a net worth of \$137.4 billion. **P 15**

3 cops suspended for MP custody death

Three policemen in MP's Dewas were suspended on Tuesday for allegedly beating a businessman so badly at a police station that he died. **Opp Page**

For global news, see
CHANDIGARH TIMES P 3

THE BETTER INDIA PICTURE CONTEST PAGE 8

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'Race against time': CJI-led bench takes up 4 key cases

Another 5-Judge Bench To Hear 4 Other Matters

Amit Anand Choudhary
@timesgroup.com

New Delhi: Facing tremendous time constraints in deciding constitutional issues in view of huge pendency of cases, a five-judge Constitution bench headed by Chief Justice UU Lalit on Tuesday suggested time-bound hearing of the cases for timely adjudication and asked lawyers to argue within the time allotted to them.

After assuming office, CJI Lalit has fast-tracked hearing of constitutional bench matters and four such cases have been listed before a bench headed by him. He admitted "it would be running against time" to decide those cases: his tenure

The CJI-led bench indicated that it would decide all four cases after hearing is concluded by October first week. The bench agreed to hear first the

matter pertaining to validity of constitutional amendment to allow 10% reservation to economically weaker sections (EWS) in government jobs and educational institutions.

► Related report, P 8

SC seeks Centre stand on quota to Dalit Christians

The SC on Tuesday asked the Centre to specify its stand in three weeks on petitions seeking inclusion of Dalit Christians among Scheduled Castes so that they can enjoy reservation in government jobs and admission to educational institutions, reports Dhananjay Mahapatra. "All old matters had been kept pending because of their social ramifications. But, there will be a day when the court has to take a call. Since the government has not placed its stand before the court, let it file its stand on these matters," the court said. **P 13**

3 HEARINGS A WEEK, 2.5 HOURS EACH

CJI-headed bench to take up

- Constitutional validity of 10% EWS quota in govt jobs and educational institutions
 - Can religion be a ground for reservation; whether Muslim community can be declared backward to grant reservation
 - Setting up Courts of Appeal to hear appeals from high courts
 - Whether Sikh educational institutions in Punjab can be deemed 'minority' institutions
- Cases to be heard for **2.5 hours each day thrice a week. Attempt to conclude hearing of one case in one week (7.5 hours)**

➤ Radia tapes: Tata privacy plea to be heard today, **P 7**

➤ No Ganesh puja on B'luru idgha ground, **P 7**

which will end on November 8. Another five-judge bench will hear four other cases.

The CJI-led bench indicated that it would decide all four cases after hearing is concluded by October first week. The bench agreed to hear first the

Infructuous': SC closes pending Guj riots cases

TIMES NEWS NETWORK

SC to hear Teesta bail plea tomorrow

The Supreme Court on Tuesday closed pending cases pertaining to the 2002 Gujarat riots for which it had formed an SIT under CBI ex-director R K Raghavan.

Senior advocate Mukul Rohtagi, appearing for the SIT, informed the court that trials in eight of the nine cases have been completed and hearing in the Naroda Patiya case is at an advanced stage and final arguments are being made in the trial court. "Since all the matters have become infructuous, this court need not entertain any application. Trial in the

Naroda Patiya case will be taken to its logical conclusion as per law," the bench said, wrapping up the cases it had been hearing for the past two decades.

► Continued on P 8

'Bigamy offence for all': SC seeks Centre's view

New Delhi: Five years after striking down triple talaq, the Supreme Court on Tuesday sought the Union government's response to a PIL seeking to enforce bigamy as an offence on all citizens irrespective of their religion and agreed to take up a bunch of PILs challenging the validity of polygamy and nikah-halala, reports Dhananjay Mahapatra.

The bench issued notice to the Centre and asked it to file a reply affidavit. If the relief sought in PIL against bigamy is allowed by the apex court, then it would automatically ban polygamy permitted under Sharia law.

► Related report, P 9

SC closes petitions on Babri-Ram Janmabhoomi row

Nearly two years after settling the Hindu-Muslim litigation over the disputed Ayodhya land, the Supreme Court on Tuesday closed proceedings on a 31-year-old petition filed by Mohd Aslam, aka Bhure, who had first sought status quo at the Babri Masjid-Ram Janmabhoomi site in 1991.

Bhure had filed the first petition challenging the acquisition of land around the disputed site by the UP government in 1991, ostensibly for creating amenities for pilgrims to Ayodhya. The SC had ordered status quo on all construction activities at the site. **P 8**

JAI HO! FILMFARE NIGHT KICKS OFF FESTIVITIES

BEST ACTOR

In a Leading Role (Male)
RANVEER SINGH | 83

BEST ACTOR (CRITICS' AWARD)

VICKY KAUSHAL | SARDAR UDHAM

BEST ACTOR

In a Leading Role (Female)
KRITI SANON | MIMI

BEST ACTRESS (CRITICS' AWARD)

VIDYA BALAN | SHERNI



BEST DIRECTOR
VISHNUvardhan | SHERSHAAH

Best Film
(CRITICS' AWARD)
Sardar Udham
—SHOOJIT SIRCAR

Best Film
(CRITICS' AWARD)
Shershaah

Actor Ranveer Singh performs at the 67th Wolf77news Filmfare Awards at the Jio World Convention Centre in Mumbai on Tuesday

FULL COVERAGE P 8

Soren sends 33 MLAs to Raipur to keep BJP at bay

ASRP Mukesh, Dhritiman Ray & Joseph John | TNN



CM Hemant Soren shepherds UPA MLAs to Ranchi airport on Tuesday

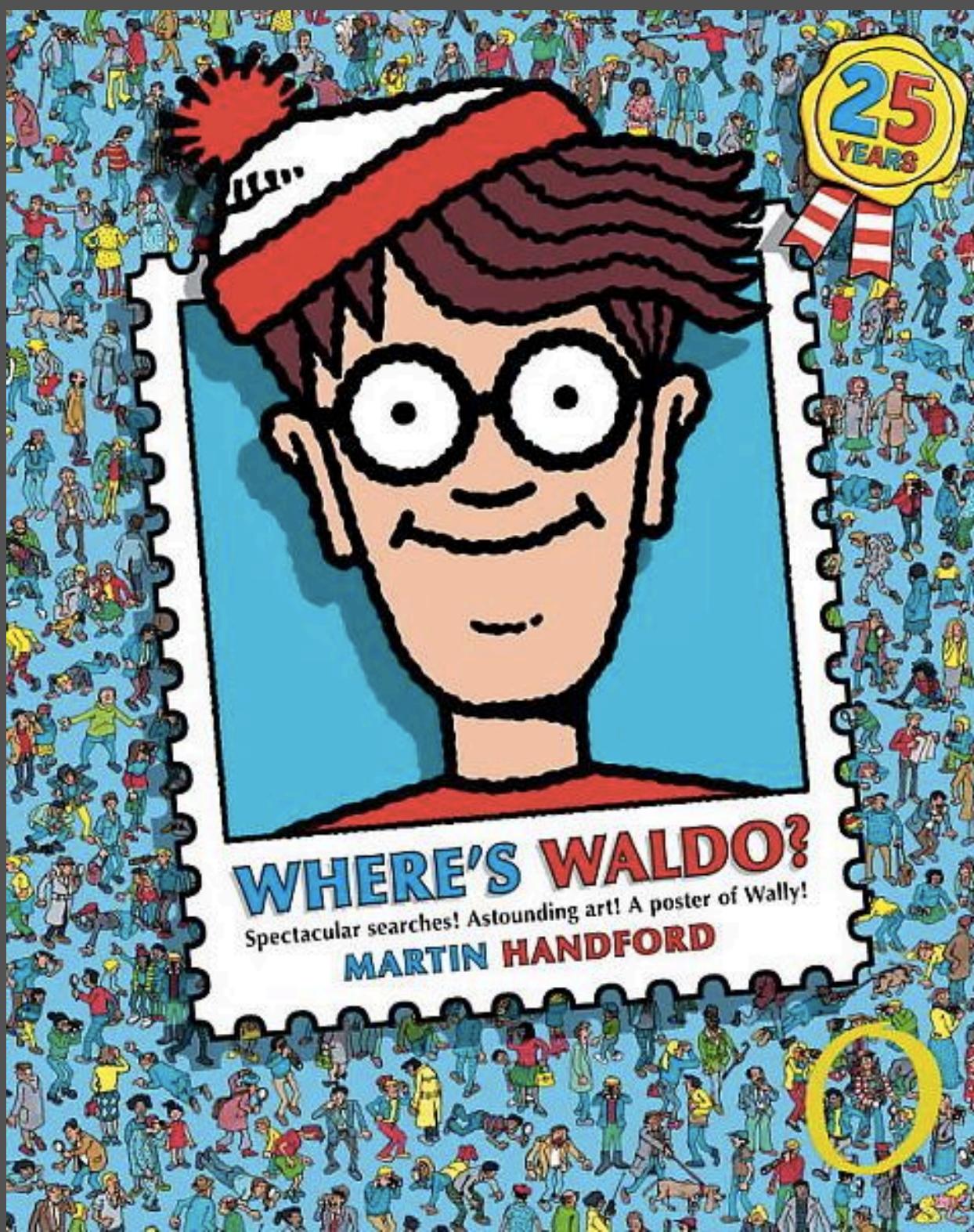
Ranchi/Raipur: Jharkhand CM Hemant Soren switched from playing the waiting game to proactive mode on Tuesday, flying out 33 MLAs of the 49-strong coalition government to a resort in Raipur amid whispers of BJP trying to poach them. The move came after six days of suspense over governor Ramesh Bais's silence on the EC's presumed recommendation to disqualify Soren as an MLA in the offce-of-profit case.

The CM was at Birsa Mun-

Moose Wala case: Bishnoi's kin held abroad

Jailed gangster Lawrence Bishnoi's absconding nephew Sachin Thapan Bishnoi, a key accused in the Sidhu Moose Wala murder case, was detained in Azerbaijan and the process to get him back to India was on, Punjab's Director General of Police Gaurav Yadav said on Tuesday. According to sources, Sachin was detained with the help of Interpol several days ago. It is learnt that Sachin Thapan fled from India under the fake name of Tilak Raj on a fake passport, which he obtained from Delhi. **P 14**





Information presentation

South Carolina							Pennsylvania						
City	Motel/Hotel	Area code	Phone	Rates			Bedford Motel/Hotel: Crinaline Courts (814) 623-9511 S: \$18 D: \$20	Bedford Motel/Hotel: Holiday Inn (814) 623-9006 S: \$29 D: \$36	Bedford Motel/Hotel: Midway (814) 623-8107 S: \$21 D: \$26	Bedford Motel/Hotel: Penn Manor (814) 623-8177 S: \$19 D: \$25	Bedford Motel/Hotel: Quality Inn (814) 623-5189 S: \$23 D: \$28	Bedford Motel/Hotel: Terrace (814) 623-5111 S: \$22 D: \$24	Bradley Motel/Hotel: De Soto (814) 362-3567 S: \$20 D: \$24
				Single	Double	Triple							
Charleston	Best Western	803	747-0961	\$26	\$30								
Charleston	Days Inn	803	881-1000	\$18	\$24								
Charleston	Holiday Inn N	803	744-1621	\$36	\$46								
Charleston	Holiday Inn SW	803	556-7100	\$33	\$47								
Charleston	Howard Johnsons	803	524-4148	\$31	\$36								
Charleston	Ramada Inn	803	774-8281	\$33	\$40								
Charleston	Sheraton Inn	803	744-2401	\$34	\$42								
Columbia	Best Western	803	796-9400	\$29	\$34								
Columbia	Carolina Inn	803	799-8200	\$42	\$48								
Columbia	Days Inn	803	736-0000	\$23	\$27								
Columbia	Holiday Inn NW	803	794-9440	\$32	\$39								
Columbia	Howard Johnsons	803	772-7200	\$25	\$27								
Columbia	Quality Inn	803	772-0270	\$34	\$41								
Columbia	Ramada Inn	803	796-2700	\$36	\$44								
Columbia	Vagabond Inn	803	796-6240	\$27	\$30								

Stroop testing

Invented by J.R. Stroop in 1935

Uses interference as a way to study access

A more accessible word will cause more interference

Test interference by asking people to name the color a word is written in



Stroop testing: let's try it

<http://cognitivefun.net/test/2>

Attention: Implications

Consider context: Make information salient when needed

Can use animation / graphics / color / font / decorations / ordering / spacing etc. to draw attention

But avoid clutter and prefer simple interfaces

Consider competition for attention

Test to see what draws attention

Note: Multi-tasking has impact on attention

Human Memory

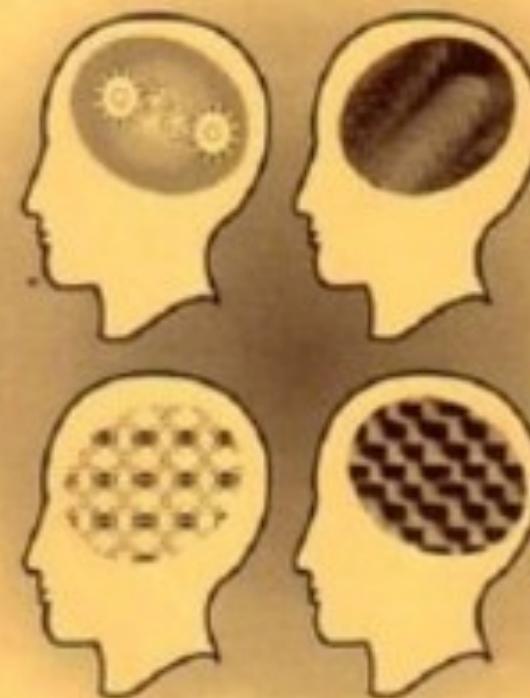
Experimental study of memory



Herman Ebbinghaus, 1850-1909

MEMORY

A CONTRIBUTION TO
EXPERIMENTAL PSYCHOLOGY



HERMANN EBBINGHOUS

C O S M O C L A S S I C S

Memory Types

Episodic vs. Semantic

Long-term vs. short-term

Working memory, muscle memory

Retrospective vs. prospective

Spatial, Temporal

Transactive

...

Memory Types

Recognition vs. recall

e.g. GUI vs. command line

Prefer recognition to recall when possible

Memory is fallible

10 Reconstruction of Automobile Destruction

Elizabeth F. Loftus and John C. Palmer

Elizabeth Loftus is well known for her extensive work on witness memory. The study reprinted here demonstrates the prejudicial effect of leading questions, or—to put it another way—illustrates the human tendency to combine information from all available sources in reconstructing the past. The elegance of Loftus and Palmer's experiment contrasts sharply with the primitive methods available to Stern seventy years earlier (Selection 9); the difference reflects the methodological progress of psychology since 1904.

Working memory

Most people can generally store $7 +/ - 2$ items in working memory

This has been taken to imply that menus should be about 7 or so items long

In generally, 7 items at a level of hierarchy seems correct

George Miller (1956)

"... the span of absolute judgment and the span of immediate memory impose severe limitations on the amount of information that we are able to receive, process, and remember. By organizing the stimulus input simultaneously into several dimensions and successively into a sequence or chunks, we manage to break (or at least stretch) this informational bottleneck.

Second, the process of recoding is a very important one in human psychology and deserves much more explicit attention than it has received. In particular, the kind of linguistic recoding that people do seems to me to be the very lifeblood of the thought processes."

Transactive memory

Externalized memory to other repositories like other people, paper or written materials, tangible objects, etc.

Memory in the Internet age

People forget items they think will be stored on a computer, and remember those they think will not be available.

Participants asked to type in trivia facts under 2 conditions: they were told it would be either saved or erased. Then they were asked to recall the facts.

Mean recall in “erase” condition: 31% vs. save condition: 22%

Memory in the Internet age

If people know where to find information, they are less likely to remember it

Participants asked to enter trivia facts and shown one of 3 messages: “erased”, “saved”, “saved in folder X”. Then asked true/false questions about the facts.

Mean correct answers:

93% (erased), 88% (saved), 85% (saved to a folder)

Memory in the Internet age

People are primed to turn to the Internet when faced with gaps in knowledge

Demonstrated with a modified Stroop test

Memory in the Internet age

Comparing interference of (e.g.) Google/Yahoo to Nike/
Target

Mean 712 ms vs. 591 ms after hard questions

Mean 603 ms vs. 559 ms after easy questions

Fun resources

<https://cognitivefun.net>

<https://psychclassics.yorku.ca>

AI and HCI

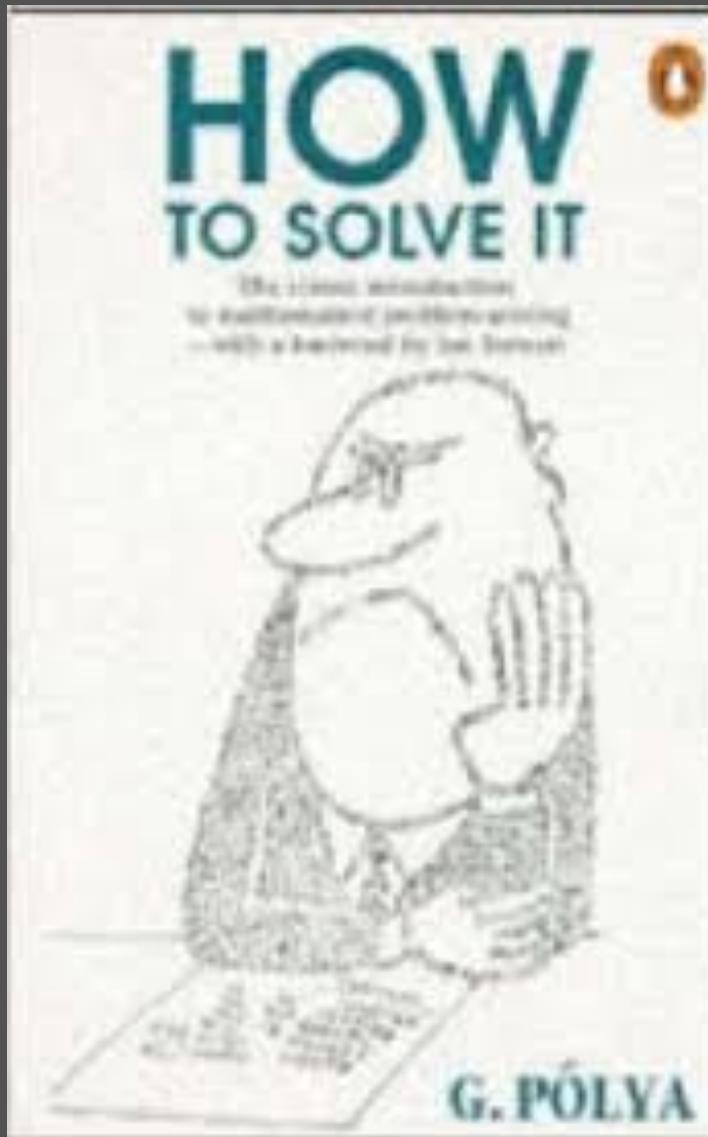
AI and HCI

Many of the HCI founders came from an AI background

Their vision was to get a computer to do what a human could, so they studied human cognition deeply

Had some success with AI applications in areas like game-playing, logic, reasoning, proof assistants, etc.

Inspiration: human problem solving



Allen Newell and Herb Simon



Pioneers in exploring cognition using computers

Deep Blue vs. Kasparov (1997)



Alpha Zero (2017)

