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18-89  
12-54

## Lecture 01

(01)

HCI

CT (Presentation) - 20%

03 Attendance - 10%

MID - 30%

GUI → Graphical User Interface Final - 40%  
100%

Remember this words:-

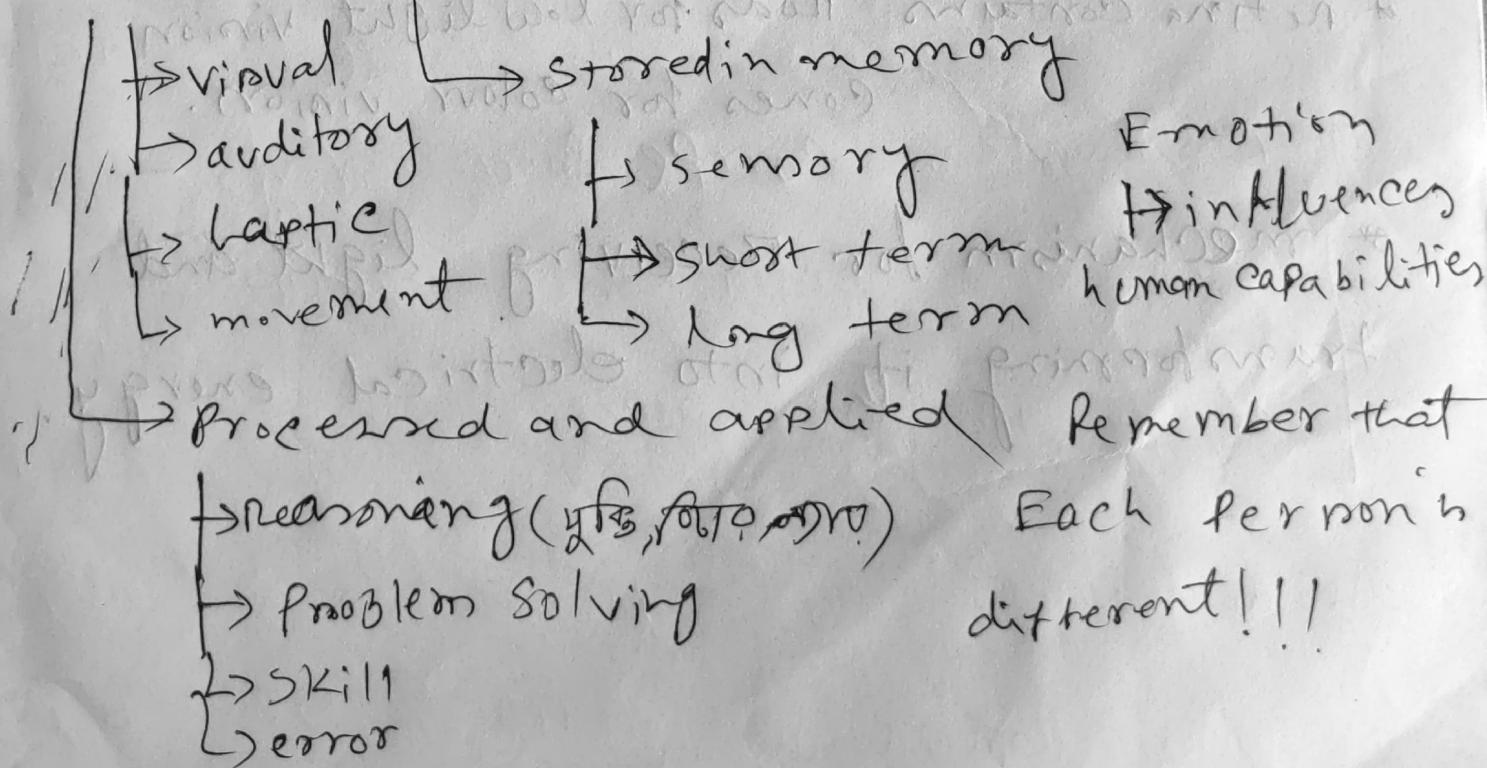
"Inclusiveness" "visual impairments".

Course  
Brain included for connecting with  
colour blind people.

will follow this site

### The human

Information, Interaction, Input, output



## Vision

vision has two stages:

① Physical reception of stimulus

আমরা দেখতে পাই, আমি reflect করে আছি।  
যুক্তিগত  
অবশ্যই দেখতে পাই, আমি reflect করে আছি।

আমার অঙ্গ এবং অঙ্গ হতে নাওো।

retina → rods (sensitive to light)

cones (less sensitive to light)

(more tolerate to light)

\* lights reflects from objects

\* ganglion cells detect pattern and movement.

\* images are focused upside-down on retina

\* retina contains rods for low light vision  
cones for colour vision.

\* mechanism for receiving light and transforming it into electrical energy.

## ② Processing and Interpretation of Stimulus

→ can <sup>first</sup> recognize ~~what~~ next time ~~what~~

### Interpreting the Signal

#### A Size and depth

- ① Visual angle (related to size and distance from eyes)  
↳ how much view object occupies.
- ② Visual acuity is ability to perceive detail (limited)

- ③ familiar objects perceived as constant size.  
(Despite changes in visual angle when far away)

- ④ Overlapping helps to measure size and depth.  
↳ like perception

depth

## B) Brightness

→ Subjective reaction to levels of light.

affected by luminance of object.

ଆଜାଣିବା ବୁଦ୍ଧିତି, measured by just noticeable difference.

Brightness (ଚିରି), Details ଆଜାଣିବା ଦ୍ୱାରା visual acuity increases.

## C) colour

ରିପଟ

i. Saturation 7 Millions colours

made up of hue, intensity

can be made

colors have different wavelength (cones)

Blue acuity is lowest.

8% males and 12% females are color blind

the visual system compensates for

movement → brain can cope up

changes in luminance,

ବୁଦ୍ଧିତି ଫାକ୍ଟର୍, ଫେର୍ ଆମଦା ଅନୁମାନ ସହି ମିଳିବା  
amguity କେବଳ ମାତ୍ର ନାହିଁ ଏହିକୁ ଉପରେ

Optical illusions → creates for over compensation.

→ অবিচিত লোক বাস্তুটি আগে দেয়!!

① the Ponzo illusion →



all same

You are thinking size of the box increasing ← estimated real.

② the Müller-Lyer illusion →

Same but

small? You are fool!

Reading:

Several stages

① Pattern कি তৈরি করি,

② তেন্তে সত্ত্ব, Decode করি internal representation.

③ Syntax, semantics, pragmatics.

1  
প্রস্তাৱ  
2  
মূল্য  
3  
অভিপ্ৰাৰ্থ

\* Word shape is important for recognition  
\* Negative contrast improves reading from  
computer screen.

Hearing → needed!!

→ provides information about Environment  
→ distance  
→ direction  
→ objects.

→ audio instructions decode / understand

It's very important.

distance, direction, object感知 idea first.

### Physical apparatus:

- ① Outer ear → protect inner ear and amplifies sound waves
- ② Inner ear → transmit sound waves as vibrations to inner ear.
- ③ middle ear → chemical transmitters are released and

Sound: Cause impulses in auditory nerve.

① pitch - frequency of sound.

② loudness - amplitude.

③ timbre - quality of sound

→ Qualitative 260 250,

20 Hz - 15 kHz 260 250, etc., with some

auditory system filters sounds.

কানে Filter আছে, কোন কোন 

→ Background noise omitted দ্রুত,  
cocktail party ~~reduces~~ phenomenon.

Touch: provides important feedback about environment.

মানব মেরু তাকে উপরে রাখা, ধরা করা,  
কানের অঙ্গুষ্ঠি মাথার তাপ স্বাক্ষর করে,

thermoreceptors — heat and cold

nociceptors — pain.

mechanoreceptors — pressure.

Some areas more sensitive than others.

→ fingers.

Kinesthesia — awareness of body position

→ affects comfort and performance

Movement: time taken to respond + stimulus.

Reaction time वाहतूर विद्या/पाठ्य.

Sensor / निकेट फिल्ड → Brain → इनियेट आउटपुट एफेक्टर

वाहतूर विद्या.

time needed to react.	Respond to stimulus:-
Vision - 200ms	reaction time + movement time.
Auditory - 150ms	depends on age, fitness etc.
Pain - 70ms	

Reaction time वाहतूर, अधिक अमर्ये और विचलन

वाहतूर प्रदृश नहीं

### Formula

Increasing reaction time decreasing the accuracy in the unskilled operator but not in the skilled operator.

## Memory

$$Mt = a + b \log_2 (DIS + 1)$$

Movement time  $\downarrow$  size of target.  
 $\downarrow$  distance

3 types of memory functions: S >>> D <<<

### ① Sensory memory

- DIS के बारे में respond दर्ज।
- continuously changes तक विशेषज्ञता से overdetect.

iconic memory : visual stimuli written.

echoic memory : aural stimuli

haptic memory : tactile stimuli + stereo sound

### Example

### ② Short time memory (STM) / Working memory

Sensory (250 ms)  $\rightarrow$  short term (STM) 250 ms.

Rapid access  $\sim$  70 ms

Rapid decay  $\sim$  200 ms

Limited capacity  $\approx 7 \pm 2$  chunks.

$\rightarrow$  202 entry.

→ attached pattern.

21 23 48 27 94

long term memory

chunks objects eas  
store easily

Long term memory (LTM)

Next class!!

## Lecture-02

Long term Memory (LTM) → Repository for all our knowledge.

- access করতে যাবে অন্তর 1/10 second.
- slow decay - শুলি আছে আছে
- Huge and old হবে ফল পাবে,
- unlimited capacity.

types two;

episodic → serial of events.

Semantic → knowledge of basic information, fact

skill, concepts. Structured.

Semantic can be derived from episodic

Semantic network → link করা হবে,

- provides access to information.
- represent relationship between bits of information.

parent node এবং child node এ মধ্যে, কিছু child এ  
special ফর্ম পদ্ধতি দেখা দ্রব্যসমূহে স্টোর হবে.

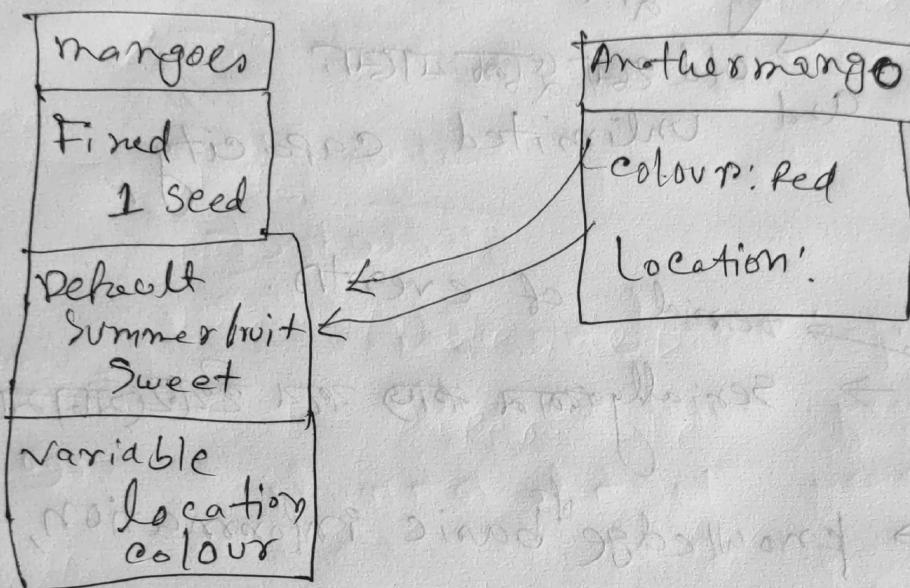
Memory efficiency

so-called

### Model of LTM - frames

another way - organized in data structures.

Frames :-



### Model of LTM - Scripts

Scripts :-

Entry condition: Roles:

Result:

Scenes: not in difference

Props:

Tracks:

## Script for a class in UIU.

Entry conditions:

valid student.

right course taken. Right room.

Registration complete

Roles: teacher.

student

teaching.

teacher teaches student

give assignment

take CT, exam. sometimes

Scener: teacher and student entire in  
the class room on time

lecture going on whole time.

Students <sup>are</sup> listening carefully and

~~asking~~ ~~answering~~ . answering the questions

Uttam school 995552

Tracks:

Student need to study for getting good grade.

~~Teachers~~ teacher should be prepared for class.

Proprietary:

Slides.

PC.

bench / table / desk

Book , Paper . etc

Board , marker.

Result:

Student acquire knowledge.

Class ends successfully.

Teacher and student leave the

classroom after lecture.

course end.

teacher gets money.

Model of LTM — production rules

Production rules :

→ अनुचित विज्ञान, विभिन्न विकास, एकत्र action फॉर्मूले

एक rules एवं मार्गदर्शक आवश्यक नहीं.

if condition matches, the take action by  
using the rule.

LTM storage of information :

① Rehearsal

→ अनुचित विज्ञान, विभिन्न विकास, एकत्र action फॉर्मूले,

② total time hypothesis

→ अनुचित विज्ञान, विभिन्न विकास, एकत्र action फॉर्मूले,

③ distribution of practice effect.

1st team → typing — 1 week — 10/12 hours

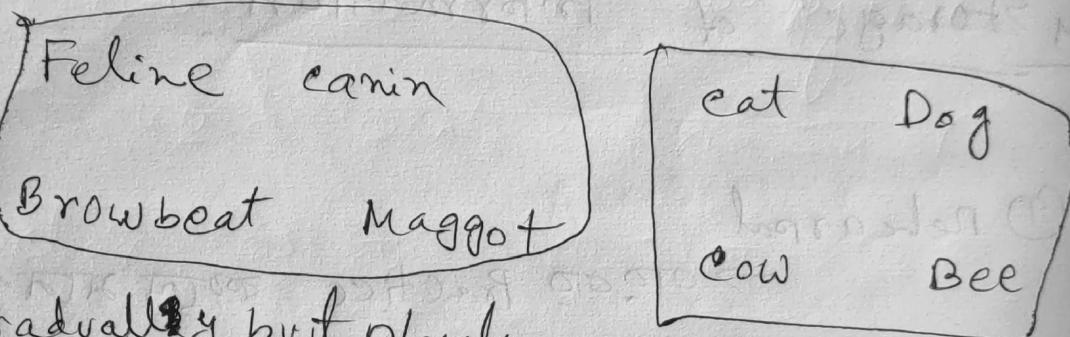
2nd team → 3 week — 10/12 divided प्र० को  
2 बार,

→ typing speed, accuracy better.

So, अनुचित विज्ञान, विभिन्न विकास, एकत्र action फॉर्मूले,

④ Structure, meaning and familiarity.  
→ Common scenarios fit. মূল ঘটনা পেতে সহজ।  
→ Story কোম্পাই, repeat করো, একটু কিছি known fact  
মুক্তি mix ৰেখা, / relate কৰো বলৈনে,

foreign words



Forgetting

→ gradually but slowly.

⑤ decay → ধূঢ়ে গেতে আসি, মাথায় মাথা।

→ Network ও deep কোথাৰে, extract কোথাৰে  
পৰিষেবা ৰেখা পাই আবেগ।

long term memory overwrite ৰেখা

⑥ Interference

→ নতুন Number, লোক কেন্দ্ৰীয়।  
Replace ৰেখা কোথাৰে পৰিষেবা আবেগ।

Old may interfere with new!

ৰেখা কোথাৰে মান আছে?

Security vs Memory. → password is secure!  
↳ related to

→ अनुभवी.  
Retrieval :- प्रतिक्रिया कोड 111 for getting-  
interference.

① Recall → this is hard to recall. Brain & image of वर्णन उदाहरण, 9 categories  
प्रतिक्रिया, → direct come out from brain.

② Recognition → छोड़े में से पहले (प्रतिक्रिया), Match नहीं  
होती है, Same situation का Match नहीं  
अमर्त्य recognition का होता है, जितना easy.

## Thinking

Previous knowledge used for new unknown problem

Solve करने की आपूर्ति, जो अन्यथा असम्भव होती है।

Reasoning, deduction, induction, abduction

Problem Solving.

## Deductive Reasoning

① Deduction:

→ Friday. So, ହୁମ୍ମା ମାଜିଲେ ଥାବା,  
direct information ମାତ୍ର, କିନ୍ତୁ, I can  
recognize.

② Logical conclusion not necessarily true.

→ two different scenarios.

ଆମାଦିର କ୍ଷେତ୍ର ଏହା ଏହା ଅଧିକ, କୁଣ୍ଡ ଏହା କିମ୍ବା

କିମ୍ବା ଏହା ଏହା.

Inference direct କରିଛି ଆମିର,

ଓ ଓ ଓ ଅଧିକ meaning କିମ୍ବା ନାହିଁନା, ଅଧିକ  
ଓ ଓ, logic ଆମାଦି ଏହା ଏହା, ଆମେ clear

ଏହା, scenario ଏହାଙ୍କ ଏହା,

truth and logical validity clash.

2 statement  
Some people are babies.  
Some babies cry.

Inference - Some people cry? true? not at all.

## Inductive Reasoning

### ① Induction:

→ यदि आति, यूँदे अनेक, तो प्र. किन्तु जरा अस्वीकार्य,  
 कोई कारण नहीं, तो विचार सुनायेंगे 26.  
 कोई environment, culture वाले बदले 26.

एवं, conflict create द्वारा Brain द्वा,

### ② Unrealiable.

→ hard to check और तो 107  
 Prove true or false → तो गलत हो सकता है 26 (परें)

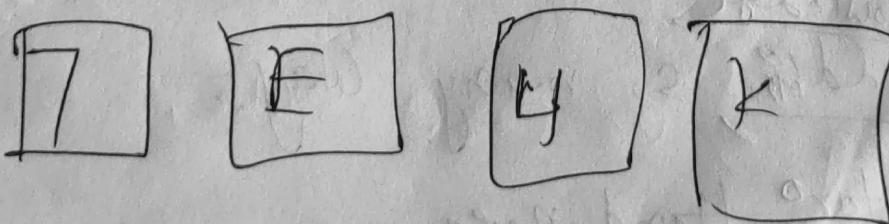
false detection is easy (जब चेतावनी देता है तो तो 26)

### ③ Humans not good at using negative evidence

Answer:- [E, 7]

example: Wason's

card



one is devoured then the even number

~~Adductive  
Reasoning~~  
~~Oneason Framework  
cause, effect~~  
~~Informations~~  
~~to. know~~

Lecture - 03      ① unreliable  
                        can lead to  
                        false explanation  
Problem Solving      part of reasoning.

মানুষ করে reasoning decision করে, But  
করেন real life এ unfamiliar task ফিরে

কীভাবে করে? তার পথ কতো চাইছেন,

→ productive - insight - known scenario গোয়েন্দা

মিলানো কোরী কৈবুল্য,

→ behaviour (information, Route, Processes)

Problem space theory:

Initial      Optimal path.      End

so many knowledge, so many way.

legal operators: Hand, nose.

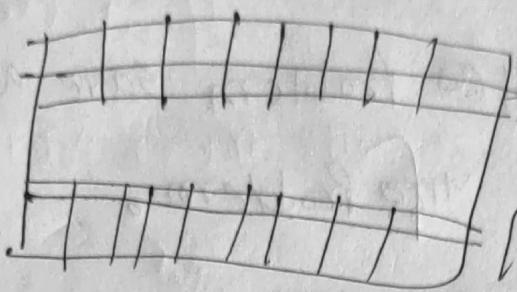
Sub Problem solves the main problem

Solve 250 पात्र, दृश्य, puzzles.

legal move

use के goal

state of the



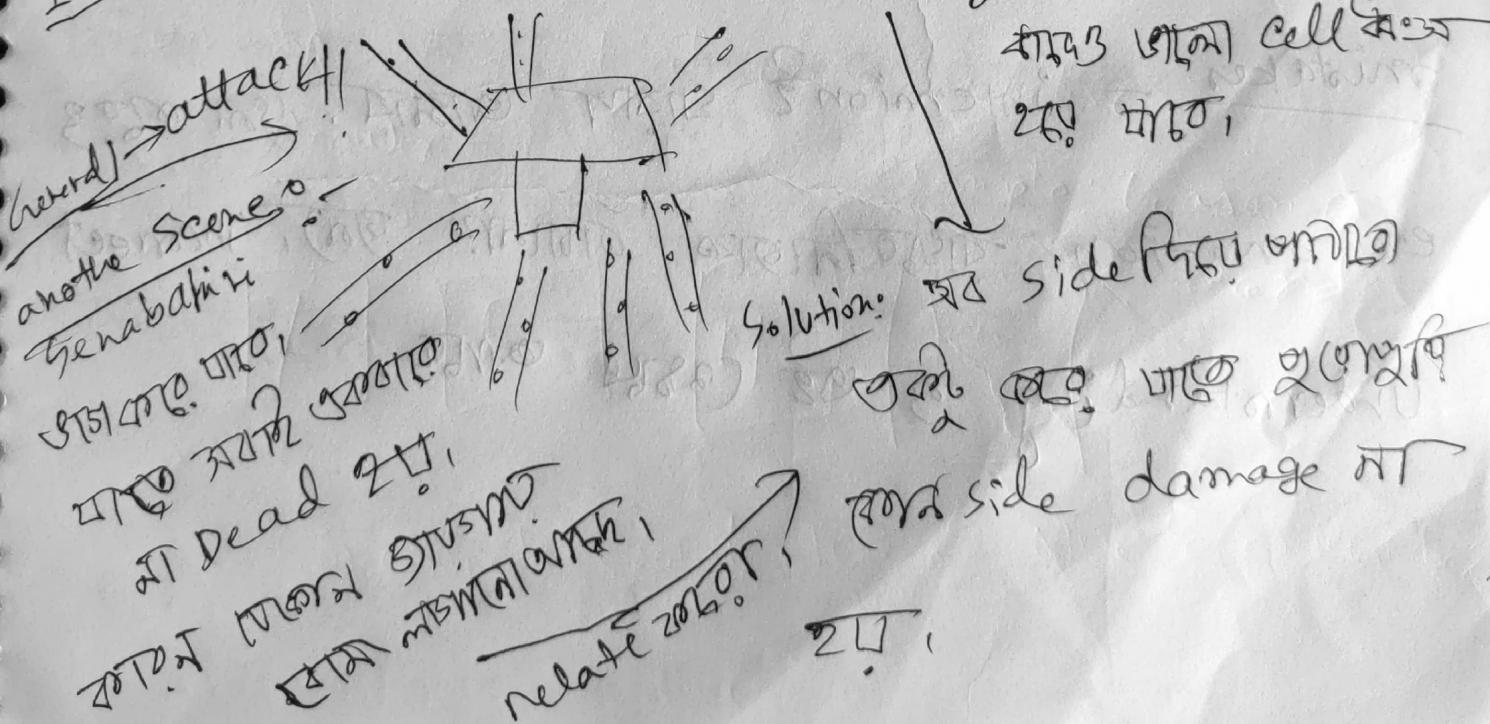
problem space.

आरा माने, Known knowledge आवश्यक नहीं apply  
रहते.

Analogy: Problem आविष्ट, किंतु known के type के

ऐसा Problem आविष्ट होने,

1st analogy  
Cancer cell → radiotherapy → healthy cell



## Skill acquisition

: ଯେତେ କେବେଳାଟି ପ୍ରୋଣ୍ଟ ହେବା ॥ ୧୨ ॥  
nayem

- Structured way to Problem solve  $\Rightarrow$  auto, to match
- Solve  $\Rightarrow$  same problem.

## Errors and Mental Models

### Types of errors:

Slips:  $\rightarrow$  intention ଥାଏଇ, skill ଏଇବେଳେ  
କିମ୍ବା ଉପରେଥିଲାଏ ଅମାନ, ଏକାମ ଏବଂ କୁଳ କିମ୍ବା

କାଳ ମାତ୍ର,

mistakes  $\rightarrow$  intention ଥାଏଇ ଆବଶ୍ୟକ, କିମ୍ବା କିମ୍ବା

explanation ବ୍ୟାଖ୍ୟାନ କିମ୍ବା କିମ୍ବା ଏବଂ incorrect

understanding ବ୍ୟାଖ୍ୟାନ କିମ୍ବା ଏବଂ

Emotion: কি শেষ বান্দ করে? For Important!!

- ① ফলের stimulus  $\Rightarrow$  প্রতিক্রিয়া  $\rightarrow$  আনন্দ, response এবং অসুস্থিরতা করে।
- ② একটি মিন্ত হিসেবে আমি  $\Rightarrow$  react করি এটিরই emotion.
- ③ situation detect  $\Rightarrow$  মডেল আনন্দ করে।

মন গোলা ধোপ করে তাহার প্রতি emotion ফুট।

$\rightarrow$  influences how we respond to situations.

Affect: — Positive mind — Problem solving skill increase.

Negative mind  $\rightarrow$  Problem solving কি কোরি আমর  
conformation বাত্তাটে ঘাসে,

a) উচ্চিক জোব রোল: interface design

যাই রাখি আমি মোকা focus HCI Design করো

যদি কুণ্ডল কুণ্ডল মন ও গোচরণ করতে।

## Individual differences

01/20/26/2

① long term → sen, physical/intellectual abilities.

→ English মানবিক বৈকল্পিক বৃত্তি,

② short term

→ stress, অবস্থার পরিবর্তন আবাদ এবং সামুদ্রিক প্রয়োগ

③ changing → ইতিহাস এবং তা বৈ মентাল চেইজেজ

অবস্থার মানুষের কাছে, মন ও চিন্তার অভ্যন্তর,

মনে ধরণ, ডেসাইন পরিমাণ এবং পরিবর্তন

expectation, cultural, environment, targeted  
audience কাহু,

Human factors এডুকেশন ব্যবস্থা design রেফার করুন

ব্রাউজ মাপুর স্ট্রাইচ করা,

