

## Question 1

- a) **HCI disciplines:** Design, Engineering, Computer science, Philosophy, Sociology, Artificial Intelligence.
- b) **Uses of vision in HCI:** Eye gaze is a good example. It can control interface. It works by tracking a person's eye movements with an eye-gaze camera, which subsequently moves the mouse on a computer screen. The individual picks objects by either 'dwelling' (keeping their gaze for a set amount of time), blinking, or pressing an external button.

**Uses of audition in HCI:** beeps, bongs, clonks, whistles and whirrs used for error

indications. Confirmation of actions. For an example key click.

**Uses of touch in HCI:** Touch and feeling are very important in HCI. Vibration, force feedback are used in games. Feel of surgical instruments in simulation which are called as haptic devices.

c) **Easy to use system.** Customers want useful content that is relevant to what they are doing at all times, in any format, and on any device. have now become “always connected” people. should be simple to install and update. should be efficient to complete their tasks without any barriers. always prefer to have a pleasant. Easy to navigate graphical user interfaces, something goes wrong in the system. They expect an effective error handling. They don't like hard systems. customer expectations and how employees deliver is another important point.

d) **Uses of skin conductivity :**

The skin conductance response (SCR) is a non-invasive indicator of basic brain function that is linked to emotion and attention. SCR amplitude is linked to the amount of arousal generated by visual stimuli with positive or negative emotional valence in humans.

The most popular skins are for [instant messaging clients](#), [media center](#), and [media player](#) software, such as [Trillian](#) and [Winamp](#), due to the association with fun that such programs try to encourage.

The human skin provides an ample, always-on surface for input to smart watches, mobile phones, and remote displays. Using touch on bare skin to issue commands, however, requires users to recall the location of items without direct visual feedback.

## Question 2

a) **constraints can be introduced and applied based on the physical built up of the users :**

Keyboard keys cannot be smaller than finger size

Smaller machines must use different input facilities

Toilet for toddlers

Specific door widths and heights (home, hospitals)

b) Three main categories of usability principles:

c) Motion sickness:

The eyes send that the person is sprinting and jumping across a dimension, while the ears transmit that there is no movement and that the body is sitting motionless in virtual reality. A kind of motion sickness can arise as a result of the conflict between the eyes and the ears.

When your brain is unable to process information from your eyes, hearing, and body, motion sickness arises. Motion may make you feel nauseous, clammy, or sick to your stomach, whether it's in a vehicle, plane, boat, or even an amusement park ride. Some folks throw up. Motion sickness can manifest itself as carsickness, seasickness, or airsickness.

Inner ear disturbances such as motion sickness are quite prevalent. It is caused by repetitive movement from a vehicle or any other movement that causes the inner ear to be disturbed. When flying in an airplane, car, or amusement park ride, some people feel nausea and even vomiting.

d) Therefore more information chunks you add to a 'interface,' the more harder it gets to 'operate' with the data available. This is especially important for first-time users, since they lack the necessary "practice" to encode the interface into long-term memory and make the behavior regular. I see this rule being breached all the time by behemoths like Facebook, Google, and WordPress.

The 5 byte chunk rule is also a good fit for minimalism as a design concept. To elucidate, owing to working memory limits, when a product grows more feature-rich, it necessarily becomes more difficult to use, since the user must handle more information while running the product. This is why information design is so important.

Miller's Law also emphasizes the need of foresight and good planning in the design process, since when you add more features to a product, its interface must be able to handle those new elements without compromising the visual foundation you've established. It takes a long time and a lot of money to rebuild a foundation.

### Question 3

a) Emotion is an essential aspect of being human. Human-computer interaction (HCI) has long been thought of as the "ultimate" exception, requiring people to set their emotional selves aside in order to operate efficiently and rationally with computers, who are ostensibly unemotional.

In our daily interactions with people and technology, emotion plays a significant role. Some people feel that emotions are what make our relationships human. Designers and HCI

researchers are attempting to comprehend the nuances of emotion and its impact on human behavior as a result of this current affective awareness.

The impact of emotion on attention has consequences for memory as well. Emotional stimuli are remembered better than unemotional experiences because emotion concentrates cognition on the eliciting stimulus.

Short term memory :

- Temporary recall of the information which is being processed at any point in time
- Holds a small amount of information (typically around 7 items or even less) in mind
- Readily-available state for a short period of time (typically from 10 to 15 seconds, or sometimes up to a minute
- "Chunking" of information can lead to an increase in the short-term memory capacity.

Long term memory: • Repository for all our knowledge

- huge or unlimited capacity
- Two types
- episodic – serial memory of events
- semantic– structured memory of fact, concepts, skills
- semantic LTM derived from episodic LTM

Three main activities related to LTM:

- Storage/Remembering of Information
- Forgetting
- Information Retrieval

b)

- c) Heart Rate: The number of heartbeats per minute or other unit of time. The amount of contractions of the ventricles (the heart's bottom chambers) determines the heart rate. To determine heart rate, the pulse is frequently collected at the wrist. The infrared sensor is in charge of transmitting infrared light to the human body. There are two transmitters and receivers on this sensor. Photodiodes can detect reflected light from the body and provide this signal to the microcontroller to detect heartbeat.

Galvanic Skin Sensor :Variations in electrical (ionic) activity caused by changes in sweat gland activity are detected by GSR measurements. It's worth noting that both positive ("happy" or "joyful") and negative ("threatening" or "saddening") stimuli can raise arousal – and hence skin conductance. We can use a GSR sensor to track sweat gland activity, which is linked to emotional arousal. The electrical characteristics of the skin are used to determine GSR.

The eyeblink rate: The usual spontaneous blink rate is said to be between 12 and 15 per minute. According to other research, the time between blinks ranges from 2.8 to 4 and 2 to 10 seconds. 3–5. Under relaxed conditions, a mean blink rate of up to 22 blinks/min has been recorded.

Nowadays in computing the interface detects voluntary eye-blinks and interprets them as control commands.

The body temperature:

The average temperature range seen in humans is known as normal human body temperature. The usual range for human body temperature is 36.5–37 degrees Celsius. The temperature of a person's body fluctuates.

#### Question 4

a)

- **Principle 1:** Equitable Use. ...
- **Principle 2:** Flexibility in Use. ...
- **Principle 3:** Simple and Intuitive Use. ...
- **Principle 4:** Perceptible Information. ...
- **Principle 5:** Tolerance for Error. ...
- **Principle 6:** Low Physical Effort. ...
- **Principle 7:** Size and Space for Approach and Use.

b) The software engineering, mechanical design, artificial intelligence, civil engineering, and human-computer interface research fields all utilize DR. It might be used in software engineering to assist designers' ideas during requirement analysis, capture and document design discussions, and forecast potential difficulties caused by new design approaches.

The DR may also be used by project managers to keep track of their project plan and status. Also, project team members who were unable to attend a design meeting can consult the DR to understand what was discussed. The DR's unsolved concerns might be utilized to convene more meetings on those themes.

The design reason may be used to document the context of a design choice, allowing another design team to see if a similar justification is suitable for their product. pondering design decisions with greater care.

Design verification, Design evaluation, Design maintenance some uses of design rational.