UNDERSTANDING THE USER
TYPES OF USERS

Lecture 02

Computer

- •When we talk about the computer, we're referring to any technology ranging from desktop computers, to large scale computer systems.

Interaction

- By interaction we mean any communication between a user and computer, be it direct or indirect.
- • **Direct interaction** - involves a dialog with feedback and control throughout performance of the task.
- **Indirect interaction** - involves batch processing or intelligent sensors controlling the environment

INPUT - OUTPUT CHANNELS - THE HUMAN

Information i/o …

visual, auditory, haptic, movement

Information stored in memory

- sensory, short-term, long-term

Information processed and applied

- • reasoning, problem solving, skill, error

Emotion influences human capabilities

Each person is different

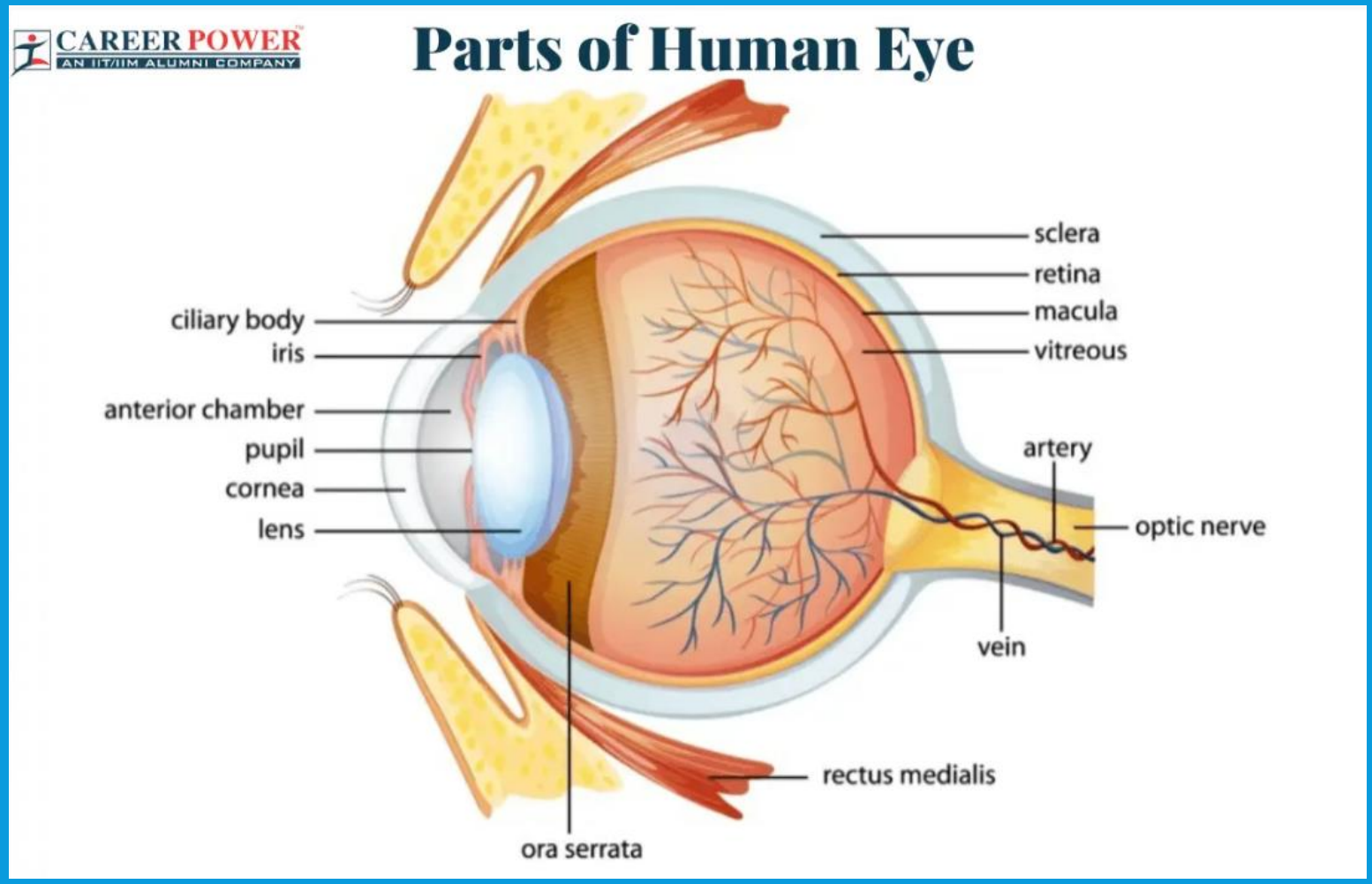
- Input in human is mainly though the senses and output through the motor control of the effectors.
- There are five major senses: Sight, Hearing, Touch, Taste, and Smell.
- There are a number of effectors: Limbs, Fingers, Eyes, Head, Vocal system.

VISION

Two stages in vision

- The physical reception of the stimulus from outside world
- • The processing and interpretation of that stimulus.

HUMAN EYE


CAREER POWER
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Parts of Human Eye
sclera
retina
macula
vitreous
ciliary body
iris
anterior chamber
pupil
cornea
lens
artery
optic nerve
vein
rectus medialis
ora serrata

Parts of the Eye	
Part Name	**Description**
Cornea	Transparent, clear and dome-shaped part of the eye which helps in focusing light and maintaining the eye's clarity.
Iris	A flat, coloured, ring-shaped membrane of an eye that controls the size of the Pupil and regulates the amount of light entering the eye.
Pupil	A dark circular opening in the center of the Iris controls the amount of light entering the eye.
Ciliary muscles	A ring-shaped muscle that changes the shape of the lens and helps to adjust the eye's focus for near and far versions.
Eye lens	A transparent, flexible structure that focuses light onto the retina, and allows us to see objects at different distances.
Retina	A layer of light-sensitive cells is present at the back of the eye and captures and converts light into nerve signals.
Optical nerve	They are a bundle of nerve fibers that carries visual information from the retina to the brain.
Sclera	A tough, white outer layer of the eye that provides structural support and protection to the delicate inner components of the eye.
Vitreous Humor	A clear, gel-like substance that fills the space between the lens and retina in the eye which helps us to maintain the shape of the eye.

THE EYE - PHYSICAL RECEPTION

- mechanism for receiving light and transforming it into electrical energy
- light reflects from objects
- images are focused upside-down on retina
- retina contains rods for low light vision and cones for color vision
- ganglion cells (brain!) detect pattern and movement

INTERPRETING THE SIGNAL

- Size and depth
- visual angle indicates how much of view object occupies (relates to size and distance from eye)
- visual acuity is ability to perceive detail (limited)
- familiar objects perceived as constant size (in spite of changes in visual angle when far away)
- cues like overlapping help perception of size and depth

INTERPRETING THE SIGNAL (CONT)

- **Brightness**

•subjective reaction to levels of light

•affected by luminance of object

• measured by just noticeable difference

•visual acuity increases with luminance as does flicker

•**Color**

• made up of hue, intensity, saturation

•cones sensitive to color wavelengths

• blue acuity is lowest

•8% males and 1% females color blind

WHAT IS READING?

- There are several stages in the reading process. First, the visual pattern of the word on the page is perceived. It is then decoded with reference to an internal representation of language.
- The final stages of language processing include syntactic and semantic analysis and operate on phrases or sentences.

- **Several stages:**
- visual pattern perceived
- decoded using internal representation of language
- interpreted using knowledge of syntax, semantics, pragmatics
- **Reading involves saccades and fixations**
- Perception occurs during fixations
- Word shape is important to recognition
- Negative contrast improves reading from computer screen

WHAT IS HEARING?

- Provides information about environment: distances, directions, objects etc
- Physical apparatus:
- outer ear – protects inner and amplifies sound
- middle ear – transmits sound waves as vibrations to inner ear
- inner ear – chemical transmitters are released and cause impulses in auditory nerve
- Sound
- pitch – sound frequency
- loudness – amplitude timbre – type or quality

- Humans can hear frequencies from 20Hz to 15kHz
- • less accurate distinguishing high frequencies than low.
- • Auditory system filters sounds
- • can attend to sounds over background noise.
- •for example, the cocktail party phenomenon

WHAT IS MEANT BY PROCESSING SOUND?

- Sound is changes or vibrations in air pressure. It has a number of characteristics which we can differentiate.
- Pitch is the frequency of the sound. A low frequency produces a low pitch, a high frequency, a high pitch. Loudness is proportional to the amplitude of the sound; the frequency remains constant.
- Timbre relates to the type of the sound: sounds may have the same pitch and loudness but be made by different instruments and so vary in timbre.