HUMAN COMPUTER INTERACTION

INTRODUCTION TO HCI

→ 21st Century - There's a lot of Design existed.

HCI has 2 Definitions

1. Human Computer Interation - Is defined as the field of study that focusing on optimizing how users and computers interact by designing Interactive computer interfaces that satisfy user's needs

→ **FACTORS TO SATISFY**
   ◆ No Error (every system has bugs)
   ◆ Prototype
   ◆ Ease of Use/Optimizing
   ◆ HCI cover up

2. Is a Study of how people interact with computers, especially as it relates to technology design.
   ◆ UI & UX combined with HCI to provides "INTUITIVE TECHNOLOGY & PRODUCTS" (simple)
   ◆ Enhancing how people utilize and comprehend an interface

→ HCI specialists considered to satisfy the users.
   ◆ Focuses on enhancing Computer Interaction.

→ Designing System and Program

→ Designs or Robot almost the same

→ However, the designer/Engr. Have different styles of their designs

→ System must USABLE, SIMPLE COMPUTER INTERFACE

HISTORY OF HCI

→ HCI started 1980's

→ Developed PC,Desktop Computers, Office, Household etc.

→ Started on **VIDEOGAMES, WORD PROCESSORS & NUMERICAL UNITS.**

→ Apple (Machintosh) 1984
   ◆ Usage become ACCESSIBLE: BETTER COMMUNICATION

→ HCI focuses on DESIGNING, IMPLEMENTING & EVALUATING INTERACTIVE INTERFACE

IMPORTANCE OF HCI

1. **Daily Lives**
   → today technology impact our daily activities
   → always carry our Smartphone
   → when we are using vending machine, ATMs (etc. We created a contact with HCI.)
   → because of HCI it becomes vital role in terms of designing and user interface

2. **Industry** - being necessary driving force
   - ➔ efficient design system will ensured every company that are accountable and comfortable in using.
   - ➔ is critical for designing safety system, such as air traffic control.

3. **Accessible to Disable**
   - ➔ a program should implies with the people with a range of capabilities,expertise, and knowledge

4. **Integral part of Program success**
   - ➔ software for end user
   - ➔ for sale programs or system to others.
   - ➔ system maintenance

5. **Useful for Untrained Communities**
   - ➔ easy to use interfaces bc of some other communities that give importance in computer systems.
   - ➔ CCTV, vending machines,sensors
   - ➔ users manual(for product)

KEY COMPONENTS OF HCI
- ➔ **The User** - referred in group who participated on common tasks./Refers to individual or group of individuals that interact with the computer systems. (Analyze the COGNITIVE, EMOTIONS EXPERIENCE)
- ➔ **The Goal Oriented Tasks** - Objective, What goal you need to achieve?
   - ◆ Relation
      - Example: booked airlines ticket
   - ◆ Aspect: Complexity "Accomplish the goal"
      - Knowledge
      - Skills
- ➔ **The Interface** - can overall user interaction|Enhanced overall interaction interface of HCI (ex. Touch, Click, Voice and Gesture)
- ➔ **The Context** - Evaluate the app on how visually appear in different lighting condition : Dark | Light
   - ◆ Correction: ML(Laggy)
   - ◆ End user experience must have impact

EXAMPLE OF HCI
- ➔ **IOT Technology** (Internet of Things) - ex. Smartwatch, Smartphone, Smart TV (2022 by IOT analytics > expected to reach 14.4B & grow to 27B by 2025)
- ➔ **Eye-Tracking Technology** - Track the motion of the eyes.| Gaze detection
- ➔ **Speech Recognition** -
- ➔ **AR/VR Technology** - applied games,company, business
- ➔ **Cloud Computing**

- ◆ Remote task
- ◆ Disadvantage:internet connection

GOALS OF HCI
- ➔ Have sound knowledge of how user use computing systems.
- ➔ Design methods, techniques and Tools
- ➔ Adjust, Test, Refine, Validate and Ensure that users achieve effective communication or interaction with the systems.
- ➔ Always give priority to end-users and lay the burst foundation of HCI

USABILITY - Easy to learn & Remember
- ➔ **How to use it**
- ➔ **Safe** - Data privacy
- ➔ **Efficient** - define the system how good is and should accomplish every task.
- ➔ **Effective** - it describes whether the system can achieve the goal
- ➔ **Utility** - function, process that provide your system.
- ➔ **Enjoyable**

USER EXPERIENCE - focuses how user feels the program
- ➔ Desirable Traits - satisfying and enjoyable
- ➔ Undesirable Traits - frustrating,annoying and unpleasant

INTERACTIVE SYSTEM DESIGN

- ➔ An interactive System is a computational system that allows users interact in real-time. Interactions received instant feedback visible to the user.
- ➔ Interactive Computing is used in a similar way, with a focus is less on the system aspect.

CONCEPT OF USABILITY ENGINEERING
- ➔ Usability Engineering is a method in the progress of software and systems, which includes user contribution from the inception of the process assures the effectiveness of the product through the use of a usability requirement and metrics.

GOALS OF USABILITY ENGINEEIRING

- ➔ Effective to use - Functional
- ➔ Efficient to use - Efficient
- ➔ Error free in use - Safe
- ➔ Easy to use - Friendly
- ➔ Enjoyable in use - Delightful Experience

➔ The methodical study on the interaction between people, products, and environment based on experimental assessment.

➔ **Usability Testing**
  ◆ The scientific evaluation of the stated usability parameters as per the user's requirements, competences, prospects, safety and satisfaction.
➔ **Acceptance Testing**
  ◆ Acceptance testing also known as User Acceptance Testing (UAT), is a testing procedure that is performed by the users as a final checkpoint before signing off from a vendor.

HCI AND SOFTWARE ENGINEERING
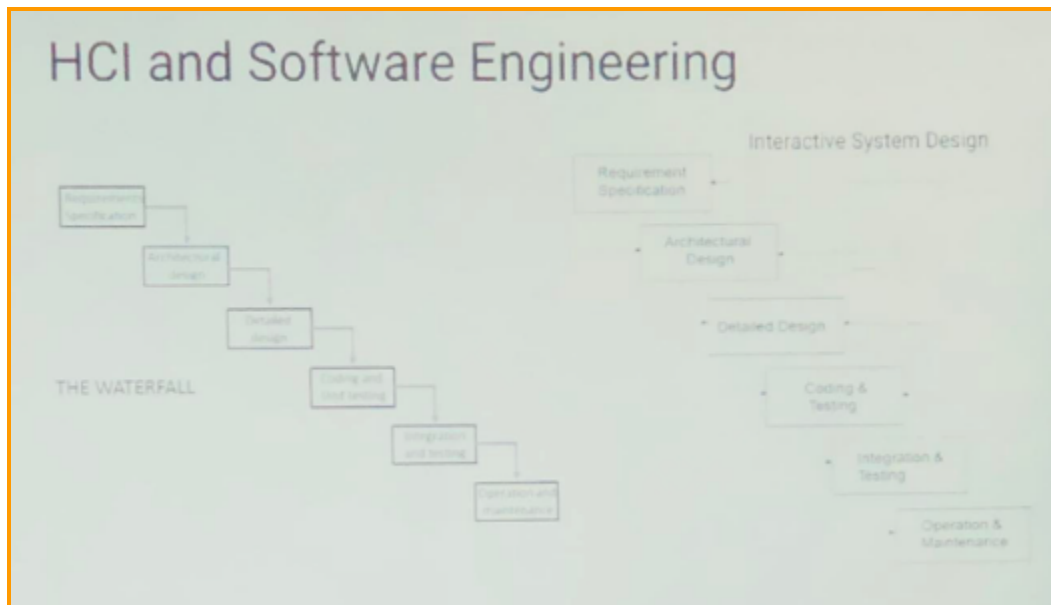
THE WATERFALL
➔ Requirements Specification
➔ Architectural Design
➔ Detailed Design
➔ Coding and Unit Testing
➔ Integration and Testing
➔ Operation and Maintenance

INTERACTIVE SYSTEM DESIGN
➔ Requirement Specification
➔ Architectural Design
➔ Detailed Design
➔ Coding and Testing

- ➔ Integration and Testing
- ➔ Operation and Maintenance

BENEFITS OF USABILITY TESTING
- ➔ Learn if participants are able to complete specified tasks successfully and
- ➔ Identify how long it takes to complete specified tasks
- ➔ Find out how satisfied participants are with your Web site or other product
- ➔ Identify changes required to improve user performance and satisfaction
- ➔ And analyze the performance to see if it meets your usability objectives

SOFTWARE TESTING LEVELS

- ➔ Unit Testing
- ➔ Integration Testing
- ➔ System Testing
- ➔ Acceptance Testing
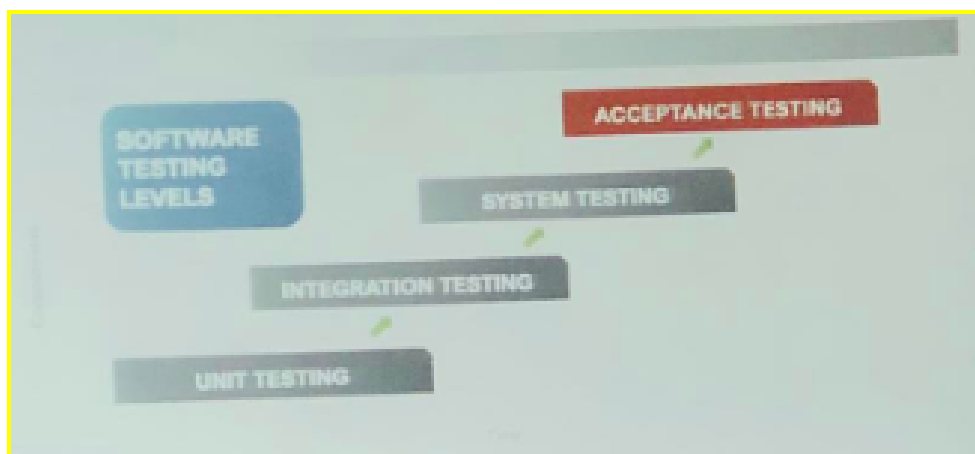
SOFTWARE TOOLS

- ➔ A software tool is a programmatic software used to create, maintain, or otherwise support other programs and applications.

- ➔ **Specification Methods**
    - ◆ The methods used to specify the GUI
- ➔ **Grammars**
    - ◆ Written instructions or Expressions that a program would understand,
- ➔ **Transition Diagram**
    - ◆ Set of nodes and links that can be displayed in text, link frequency, state diagram, etc.
- ➔ **Statecharts**
    - ◆ Chart methods developed for simultaneous user activities and external actions.

- ➔ **Interface Building Tools**
    - ◆ Design methods that help in designing command languages, data-entry structures, and widgets.
- ➔ **Interface Mockup Tools**
    - ◆ Tools to develop and quick sketch of GUI
- ➔ **Software Engineering Tools**
    - ◆ Extensive programming tools to provide user interface management system
- ➔ **Evaluation Tools**
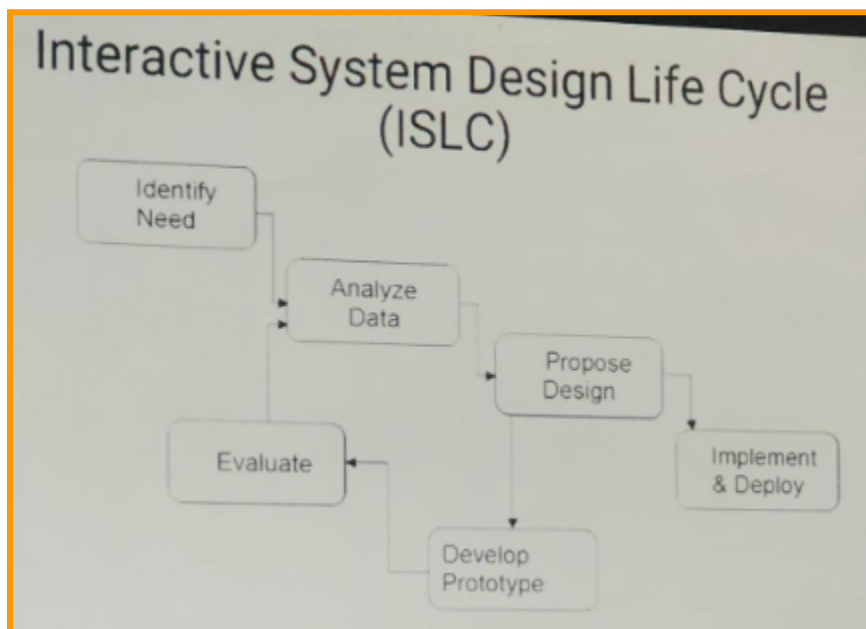   - ◆ Tools to evaluate the correctness and completeness of programs

PROTOTYPING
- ➔ Interface of a proposed system
- ➔ A sketch of the interface

USER CENTERED DESIGN (UCD)
- ➔ The process of collecting feedback from users to improve the design

INTERACTIVE SYSTEM DESIGN LIFE CYCLE (ISLC)

KEY PRINCIPLES OF INTERACTIVE DESIGN

- ➔ Learnability
- ➔ Memorability
- ➔ Consistency
- ➔ Visibilty
- ➔ Constraints
- ➔ Feedback