Goals of HCI

① USABILITY

One of the key concepts of HCI. It is concerned with making systems easy to learn and use. A usable system is
- Easy to learn
- Easy to remember how to use
- Effective to use
- Efficient to use
- Safe to use
- Enjoyable to use

② Safety – means protecting the user from dangerous conditions and undesirable situations
- Users
  - Nuclear energy plant or bomb-disposal – operators should interact with computer-based systems remotely
  - Medical equipment in intensive care unit (ICU)
- Prevent user from making serious errors by reducing risk of wrong keys/buttons being mistakenly activated
- Provide user with means of recovery if errors
- Ensure privacy (protect personal information such as habits and address) & security (protect sensitive information such as passwords, VISA card numbers).

② Utility – extent of providing the right kind of functionality so that users can do what they need or want to do.

- High Utility
  - scientific calculator provides many mathematical operations, built-in formulae, and is programmable
- Low Utility
  - Software drawing tool does not allow free hand drawing but supports polygon shape drawing

③ Effectiveness: concern a user's ability to accomplish a desired goal or to carry out work.

- Find a master thesis in our library web.

④ Efficiency: a measure of how quickly users can accomplish their goals or finish their work using the system.

- Find a book "human computer interaction" in our library web.
- How about a master thesis whose author's last name is "Cheng"?
- How about the newest book in the subject of "human computer interaction"?

④ Usability: means ease of learning and ease of use
- Can I use the basic functions of a new digital camera without reading the manual?
Yes. Because digital camera products have different functionalities on their buttons.

⑤ Appeal: how well the user likes the system
- First impression
- Long-term ~~impression~~ satisfaction

HCI Goal Example
- Use Microsoft WORD as an example

Goals	Achieved?	Example
Safety	Yes	Warning for "Exit before Save"
Utility	Yes	A lot of word process functions is provided
Effectiveness	Yes	A science student can edit equations
Efficiency	Yes	Default template avoids initial document setting
Usability	Yes	Icons help ease of learning
Appeal	Yes	Interface is attractive

Benefits and Functionalities of HCI

① ~~Gaining Mark~~ Benefits
① Gaining Market share
② Improving productivity
③ Lowering Support Cost
④ Reducing Development Cost
etc.

Gaining market share

- People intend to buy/use products with higher usability e.g. google search engine has the largest market share because it's easy to use with higher effiency.
- Improving productivity
- Employees in a company perform their jobs in a faster manner. e.g workers in a mainland company needed to press a lengthy sepuence of buttons in performing a task. An IAS student helped to increase their productivity via writing a batch program for the button press operation e.g. Intranet can increase employees efficiency. Improved productivity means providing performing more operations faster.

③ Lowering support costs
- If the product is not usable, calls to customer support can be enormous
e.g. If a washing machine is difficult to use even after reading the instruction manual, many users will call the customer service and the cost per call can be over $100

Reducing development cost
- Avoid implementing features users don't want and creating features that are annoying or inefficient e.g. if there are too many unnecessary confirmation dialog boxes in using a word processor, it is likely this product needs to be ~~redeployed~~ redeveloped.

Functionality of HCI

Lamp
- function/objective: to illuminate the environment
- Interface: power switch button
- Function Part: light bulb
- Interaction: press "on", light on; press "off" light off
- User tasks: turn on the lamp, turn off the lamp.

Stapler

- objective: to bind paper together
- Interface: top surface where you press
- Functional part: Stapler ejection gap
- Interaction: put an edge of the stack of paper in the stapler's mouth, press down firmly and quickly, hear "click" sound, see paper bound
- User tasks: bind paper together, refill the staples

Word processor

- objective: to edit document
- Interface: windows, icons, menus, pointers (WIMP), etc
- Functional part: sub-routines for command execution, file handling, etc.
- Interaction: use mouse to click the "WORD" icon, observe WORD is invoked, use mouse to click "FILE" icon....
- User tasks: edit file, save file, etc.

Components of HCI

There are 3 main components of HCI

- Human
- Computer
- Interaction

Why do we need to understand humans?

- Interacting with technology is cognitive
- Human information process referred to as Cognition
- Human cognition process is involved when interacting with system, like attention, perception and recognition, memory, learning, reasoning, problem solving and decision making.
- Need to take into account cognitive processes involved and cognitive limitations of users.
- Provides knowledge about what users can and cannot be expected to do.
- Identifies and explains the nature and causes of problems users encounter
- Supply theories, modelling tools, guidance and methods that can lead to the design of better interactive products.

- Must consider what are users good and bad at?

What is Interaction?

Communication

User ⟷ System

- Interaction refers to a dialogue generated by the command and data input to the computer and the display output of the computer and the sensory / perceptual input to the human and motor response output of the human.

There are number of ways in which the user can communicate with the system, batch input, direct manipulation etc.

What is Interface?

Interface is made up of a set of hardware devices and software tools from the computer side and a system of sensory, motor and cognitive processes from the human side.

Interaction takes place at the Interface.