**Dr. Naureen Nizam**

nnizam@cs.toronto.edu

# Lecture 1: Course Overview & Logistics
# Introduction to HCI & Historical Context

CSCC10H3: Human-Computer Interaction
(In-Person)
Department of Computer and Mathematical Science
May 11, 2022

**UTSC** Tomorrow is created here

**UNIVERSITY OF TORONTO SCARBOROUGH**
1265 Military Trail, Toronto, Ontario  M1C 1A4

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# COVID-19: IN-CLASS GUIDELINES

## GENERAL MEASURES
### Community Check-In

**Face masks**

In light of the recent provincial trends, the University will continue its requirement to wear masks in certain settings until June 30, 2022, in accordance with the **Joint Provostial and Human Resources Guideline on Face Masks**.

Masks will continue to be required in classrooms and in indoor spaces where physical distancing cannot be maintained. The University continues to recommend the use of **medical-grade masks** where possible.

# COVID-19: IN-CLASS GUIDELINES

## GENERAL MEASURES
### Community Check-In

**Ucheck**

As of May 1, 2022, health screening and contact tracing will become unavailable in UCheck.

These features may be reinstated with little notice in the event that public health guidance or recommendations change.

The proof of vaccination module will continue to be available and can be used to:
•Upload proof of vaccination (required for new employees)
•Voluntarily upload proof of booster (additional) doses for all students, faculty, librarians, and staff

While health screening through UCheck is unavailable, individuals can monitor their health using the **provincial health screening tool.** Completing a health screening before coming to campus is highly recommended, and we continue to ask members of our community to remain at home if they are ill.

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## PREVENTION AND PRECAUTIONS

Please remember to:

Stay home if you are ill.

Avoid touching your eyes, nose and mouth.

Cough or sneeze into a tissue and immediately dispose of it in the garbage and wash your hands afterwards.

Wash your hands often with soap and water for at least 15 seconds. If soap and water are not available, use a hand sanitizer with at least 60% alcohol.

Avoid prolonged personal contact, such as touching or shaking hands. Consider greeting others with a nod, wave or bow.

If you don't have a tissue, sneeze or cough into the bend of your arm.

Clean and disinfect frequently touched objects and surfaces.

### REMEMBER...
What we can do to keep us all safe.

## Administrivia

- **Course Delivery Format:**

**Lectures:**

| | | | | | |
|---|---|---|---|---|---|
| LEC01 | WE | 12:00 | 14:00 | SW 143 | In-Person |

**Tutorials:**

| | | | | | |
|---|---|---|---|---|---|
| TUT0001 | FR | 13:00 | 14:00 | BV 473 | In-person (Sarah Hameed) |
| TUT0002 | TH | 11:00 | 12:00 | BV 473 | In-person (Mexiuan Lu) |

**Course Website & Discussion Board:** Quercus [https://q.utoronto.ca]

- **Office Hours:**
  - Wednesdays 2 – 3 pm
- **Email:** nnizam@cs.toronto.edu

## Why HCI?

- Can prevent accidents/save lives
  - The Kegworth Air Disaster Happened Because of a Digital Dial (1989) – Boeing 737 - Pilot shuts down the wrong engine and plane crashes - 47 died
  - Air Inter Flight 148 Crashed (1992) – Airbus A320 - because a Display Screen Was Too Small – 87 died

- Can reduce cost of customer training and support

- HCI jobs

## The plan for today..

- Course Website & Overview

- Course Syllabus

- Introduction to HCI

- Historical Context

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## Course Website

- Quercus

  - Course Syllabus
  - Modules – weekly lecture slides, readings, assignment and project details, etc.
  - Announcements
  - Weekly Discussion Questions
  - Assignment Submissions
  - Project Submission
  - Grades

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# Course Overview

*The course will provide an introduction to the field of Human-Computer Interaction (HCI) with emphasis on guidelines, principles, methodologies, and tools and techniques for analyzing, designing and evaluating user interfaces. Subsequent topics include usability assessment of interactive systems, prototyping tools, information search and visualization, mobile devices, social media and social networking, and accessibility factors.*

- **Prerequisite:**
  CSCB07H3 – Software Design
  [CGPA 3.5 or enrolment in a CSC Subject POST]

- **Exclusion:**
  CCT380H5: Human-Computer Interaction and Communication
  CSC318H1: The Design of Interactive Computational Media

- **Breadth Requirement:**
  Quantitative Reasoning

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# Learning Objectives

By the end of the course, you will:

- Have gained a deeper understanding of HCI guidelines, principles and theories and how they apply to the design of user interfaces;
- Have hands-on experience analyzing, designing and critically evaluating user interfaces through a group project;
- Have the skills and knowledge necessary to gather and understand user requirements;
- Have experience using prototyping tools;
- Have experience conducting usability testing;

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## Learning Objectives (cont'd)

- Use visualization tools to visualize and analyze social media data;
- Apply analytical skills in real-world to understand user-interface design issues, observe emerging trends, and make recommendations;
- Learn to effectively work in a team environment;
- Learn to critically assess and provide feedback to peers;
- Learn public speaking and presentation skills through group project;
- Learn the ability to find and cite information from credible sources.

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## Course Readings



- Additional Readings

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## Course Format

The course will consist of the following:
- Lectures (10 min break mid-way)
- Tutorials (weekly, starting next week)
- Weekly Discussion Questions (Online)
- Assignments (x3)
- Group Project (4 phases)
- Final Exam

## Evaluations

| Components | Weight |
| --- | --- |
| Participation | 5% |
| Assignments | 25% |
| Group Project | 40% |
| Final Exam* | 30% |
| Total | 100% |

* To pass the course you must receive at least 50% on the final exam.

## Components

- Participation (5%):
  - Weekly discussions (Quercus)  (5%)


- Assignments (20%):
  - 3 assignments (10%, 5%, 10%)


- Group Project (40%)
  - 4 Phases (5%, 10%, 10%, 15%)


- Final Exam (30%)


*\* refer to the course syllabus for additional details and due dates*

## Tentative Course Outline

| Week | Date | Topic | Readings | Assignments/ Projects | Tutorial Topics |
|---|---|---|---|---|---|
| Week 1 | May 11 | Course Overview, Introduction to HCI and Historical Context | HCI – Ch. 1 | - | - |
| Week 2 | May 18 | Universal Usability, Usability – Guidelines, Principles and Theories | DTUI – Ch. 1, 2, 3 | P1 Posted | TA Introduction, Project Overview Form Groups |
| Week 3 | May 25 | User Centered Design: Establishing Requirements (Surveys, Interviews, Observation) | ID – Ch. 2, 8, 11 DTUI – Ch. 4, 12 | A1 Posted | Project Pitch & Case Study: Understanding Users |
| Week 4 | Jun 1 | Designing & Prototyping | ID – Ch. 12, 13 DTUI – Ch. 4, 5 | P1 Due (May 31); P2 Posted | Exercise: Surveys, Interviews, etc. |
| Week 5 | Jun 8 | Design Workshop – Part 1 | ID – Ch. 9, 10 | A1 Due (Jun 10); A2 Posted | Demo & Workshop: Prototyping Tools |
| Week 6 | Jun 15 | Design Workshop – Part 2 & Evaluating: Heuristic, Usability Testing & Ethics | ID – Ch. 14, 15, 16 DTUI – Ch. 5 | P2 Due (Jun 14); P3 Posted A3 Posted | Exercise: Usability Testing Case Study |
| | | Reading Week – No Class (Jun 21 – 25) | | | |
| Week 7 | Jun 29 | Group Presentations on Emerging Trends, Data Analysis & Case Studies | ID – Ch. 14 DTUI – Ch. 6 | A2 Due (Jun 29) | No Tutorials (University Closed) |
| Week 8 | Jul 6 | Interfaces – Research & Design Considerations - Part 1 | ID – Ch. 7 DTUI – Ch. 7, 8, 9, 10 | A3 Due (Jul 8) | Exercise: CHI Paper Critical Review |
| Week 9 | Jul 13 | Interfaces – Research & Design Considerations - Part 2 | ID – Ch. 7 DTUI – Ch. 7, 8, 9, 10 | P3 Due (Jul 12); P4 Posted | Project Work: Usability Testing |
| Week 10 | Jul 20 | Social Computing - User-Generated Content, Collaboration and Social Media Participation | ID – Ch. 5 DTUI – Ch. 11 | | Project Work: Usability Testing |
| Week 11 | Jul 27 | Information Search & Visualization | DTUI – Ch. 15, 16 | | Project Work: Report |
| Week 12 | Aug 3 | Review of Final Exam | | P4 Slides Due (Aug 3); P4 Report Due (Aug 10) | P4 - Group Project Presentations |
| | | | | Aug 9th and 10th Tutorial | P4 - Group Project Presentations |
| | | Final Exam (Aug 15 - 26) http://utsc.utoronto.ca/registrar/examination-schedule | | | |

## Submission of Work

**All work must be submitted through Quercus at 11:59 PM EST the day it's due.**

Unless you have legitimate documentation for a late assignment, **10%** of the total value of the assignment will be deducted for each day that it is late to a maximum of **5 days**. An assignment is considered late as soon as the due date and time passes (i.e., one minute past 11:59 PM EST), so you are strongly encouraged to submit your assignments early in order to avoid any technical delays. Difficulties with the Quercus portal will not be accepted as a legitimate reason for a late assignment.

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## Re-mark Policy

You may request a re-evaluation of term work if you believe it has been incorrectly or unfairly marked. You must make such requests within **one week** of receiving your marks back. The requests should be sent to your TA in writing.

**Please note, if a remark request is granted, the student must accept the resulting mark as the new mark, whether it goes up or down or remains the same.**

*Note*, the re-mark policy only applies to term work and excludes final examinations. Final Examination re-reads are handled directly by the Office of the Registrar.

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## Academic Offenses (Plagiarism)

"The work you submit must be your own, done without participation by others. It is an academic offense to hand in anything written by someone else without acknowledgement."

You are not helping your friend when you *give* him or her a copy of your assignment. You are hurting your friend when you *ask* him or her to give you a copy of their assignment.

**All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see http://www.utoronto.ca/academicintegrity/).**

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## Diversity and Inclusion Statement

It is important to create an atmosphere for learning that respects the rich variety of backgrounds and perspectives that we all represent. While working together to build this community we ask everyone to:

- Share their unique experiences, values and beliefs.
- Be open to the views of others and value each other's opinions.
- Communicate in a respectful manner.
- Keep discussions confidential, especially those that may be personal in nature.

Diversity and inclusion are critical components in HCI. In order to design effective user interfaces, we need to be open to the different needs of the end user and be respective of their experiences, practices, backgrounds, and different perspectives. Therefore, strive to include, be open and inclusive throughout the course and thereafter.

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## Access*Ability*

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Access*Ability* Services Office as soon as possible. We will work with you and Access*Ability* Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC Access*Ability* Services staff (located in SW302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

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## Resources for you to succeed!

Academic Advising and Career Centre - http://www.utsc.utoronto.ca/aacc/

Centre of Teaching and Learning - http://www.utsc.utoronto.ca/ctl/

Library - https://utsc.library.utoronto.ca/

Registrar's Office - http://www.utsc.utoronto.ca/registrar/

The Writing Centre - http://www.utsc.utoronto.ca/twc/

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# Slide 23

## Any Questions on Course Syllabus



**CSCC10H3: Human-Computer Interaction (HCI)**
**Course Syllabus**

Department of Computer and Mathematical Sciences
University of Toronto Scarborough
Summer 2022

**Course Instructor:**
Naureen Nizam, PhD
**Email:** nnizam@cs.toronto.edu (Please include "CSCC10" in the subject line).
**Office Hours:** Wednesdays 2:00 pm – 3:00 pm

**Time, Location and Websites:**
**Lectures:**
LEC01      WE    12:00  14:00  SW 143        In-Person

**Tutorials:**

TUT0001    FR    13:00  14:00  BV 473        In-person (Sarah Hameed)
TUT0002    TH    11:00  12:00  BV 473        In-person (Maxtian Lu)

**Course Website & Discussion Board:** Quercus [https://q.utoronto.ca]

**Course Description:**
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**Learning Objectives:**
By the end of the course, students will:
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# Slide 24

## The plan for today..

- Course Website & Overview ✔

- Course Syllabus ✔

- Introduction to HCI

- Historical Context

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## What is HCI?

**"HCI** (**human-computer interaction**) is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings."
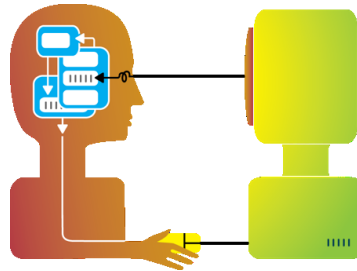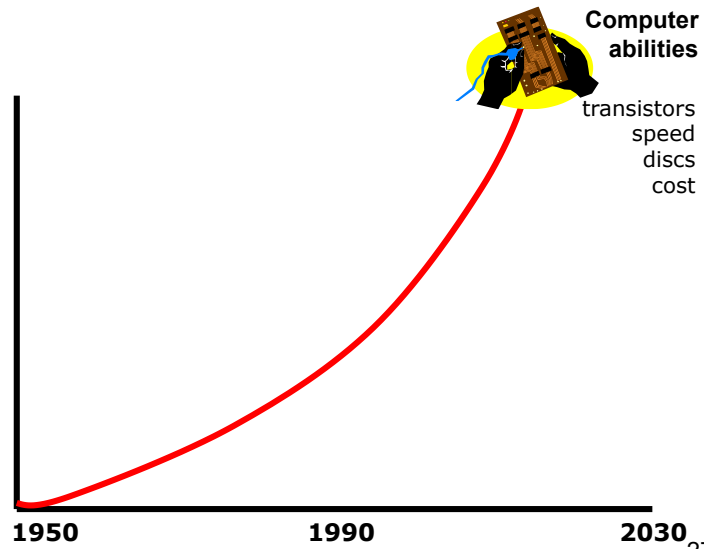
## HCI - 3 Parts

- **Humans:** the user of a computer program, device, other information technology

- **Computer:** the physical device, artifact, or hardware that runs the program

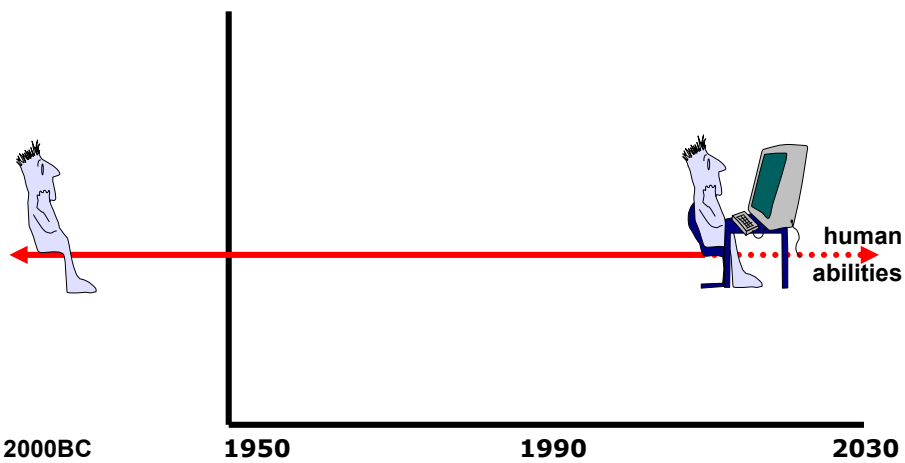- **Interaction:** the communication between the human and the computer (direct or indirect)

# Moore's Law

**Computer abilities**

transistors
speed
discs
cost

1950          1990          2030

Slide idea by Bill Buxton

# Psychology

**human abilities**

2000BC      1950          1990          2030

Slide idea by Bill Buxton

# HCI is..

a discipline concerned with the



Design          Implementation

Evaluation
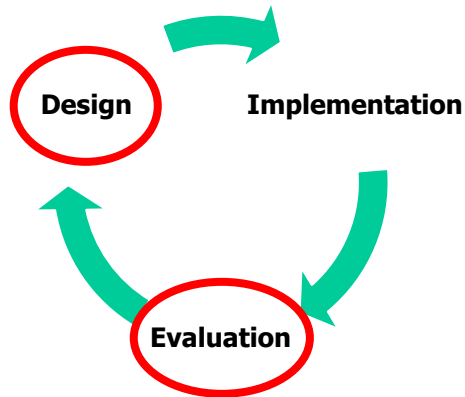
of interactive computing systems for human use and with the study of major phenomena surrounding them.

*Slide by Saul Greenberg*
*Card, et. al (2009)* 29

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# History of HCI

- In the beginning, there were humans.
- In 1940s, came computers

  What happened between 1940s and 1980s?

- In 1980s, came interaction <= **HCI emerged**

\*  *Next set of slides are from the Human-Computer Interaction text by Scott Mackenzie and Dr. Kristie Hawkey*

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# Significant Event Timeline

1945 - Vannevar Bush publishes "As We May Think" in *The Atlantic Monthly*

1940

1950

1960

1962 – Ivan Sutherland develops *Sketchpad*

1963 – Douglas Engelbart invents the computer mouse

1970

1981 – Xerox *Star* launched

1980

1982 – ACM SIGCHI formed

1983 - Card, Moran, and Newell publish *The Psychology of Human-Computer Interaction*

1984 – Apple *Macintosh* launched

1990

2000

2007 – 25th Anniversary of "CHI", the SIGCHI annual conference

2010

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# Eniac (1943)

The world's first all electronic numerical integrator and computer.
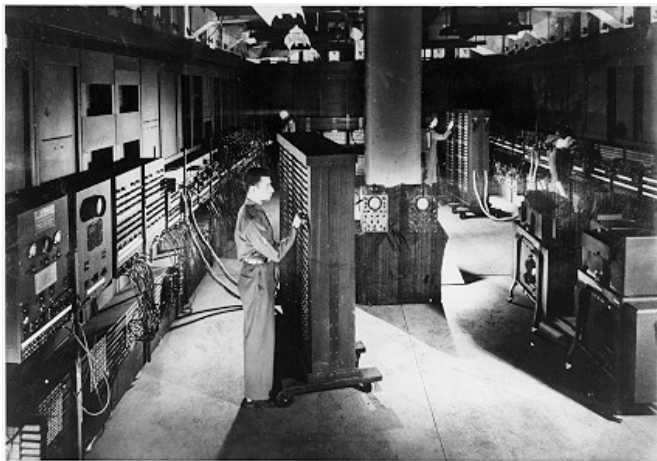


*From IBM Archives*

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# Vannevar Bush (1945)

"As We May Think"

# Ivan Sutherland's Sketchpad (1962)
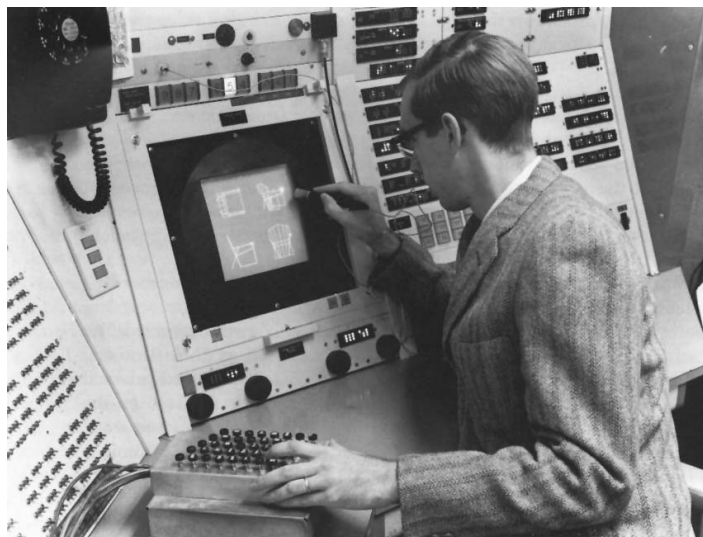
## Invention of the Mouse
## Doug Engelbart (1963)
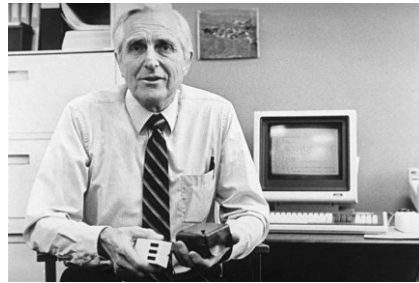




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## First HCI User Study

A comparative evaluation of…


Mouse


Joystick


Knee-controlled lever

User's Knee → Lever →
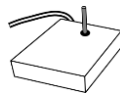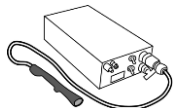

Lightpen
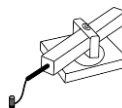

Grafacon
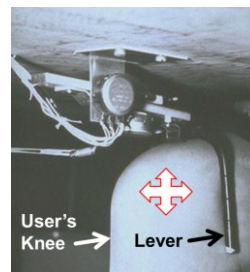
[1] English, W. K., Engelbart, D. C., & Berman, M. L. (1967). Display selection techniques for text manipulation. *IEEE Transactions on Human Factors in Electronics, HFE-8*(1), 5-15.

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## Experimental Design

Participants: 13

Independent variable

"Input method" with six levels: mouse, light pen, Grafacon, joystick (position-control), joystick (rate-control), knee-controlled lever

Dependent variables

Task completion time, error rate

(Note: task completion time = access time + motion time)

Within-subjects, counterbalanced

Task:

Press spacebar, acquire device, position cursor on target, select target
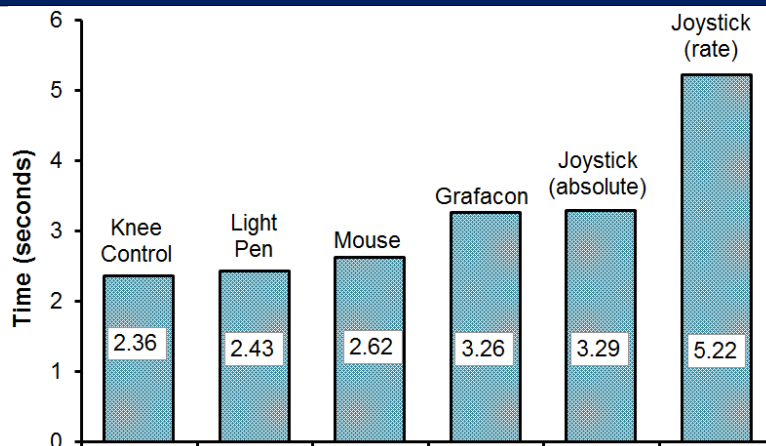
## Results (1)



Notes:
[1] Access time with the knee-controlled lever was zero (since the device is always "acquired").
[2] Light pen use is fatiguing, since the user's arm is held in the air in front of the display.

# Results (2)
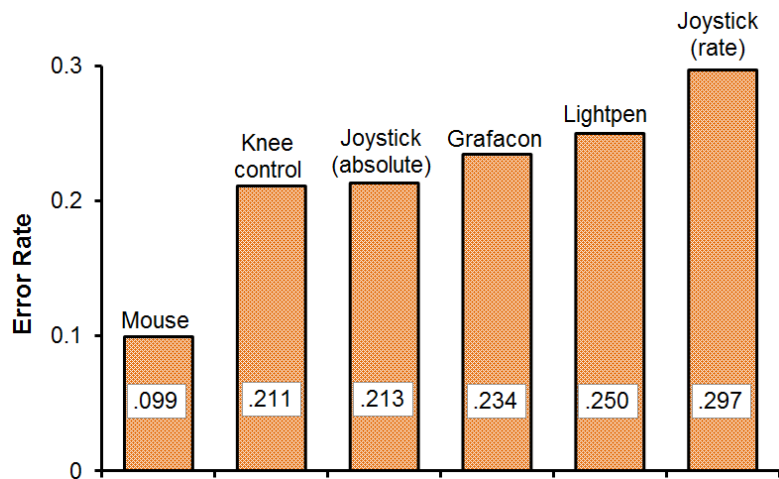
# Personal Computer

Alan Kay (1969):

- Dynabook vision (and cardboard prototype) of a notebook computer:

# Personal Computer

**Xerox PARC, mid-' 70s**
- Alto computer, a personal workstation
  - local processor, bit-mapped display, mouse
- modern graphical interfaces
  - text and drawing editing, electronic mail
  - windows, menus, scroll bars, mouse selection, etc
- local area networks (Ethernet) for personal workstations
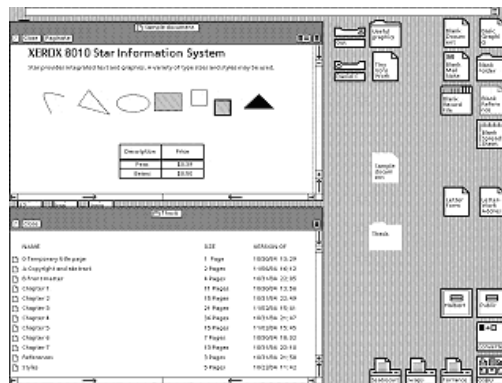  - could make use of shared resources

**ALTAIR 8800 (1975)**
- Popular electronics article that showed people how to build a computer for under $400

# Xerox Star (1981)

First commercial personal computer designed for "business professionals"

First comprehensive GUI based on Xerox PARC (Lead by Alan Kay)

# Star GUI Icons

Document  Folder  Record File  File Drawer  Calculator  Terminal

Dialog

In Tray  Out Tray  Floppy Disk Drive  Printer  User (Williams)  User Group (Designers)
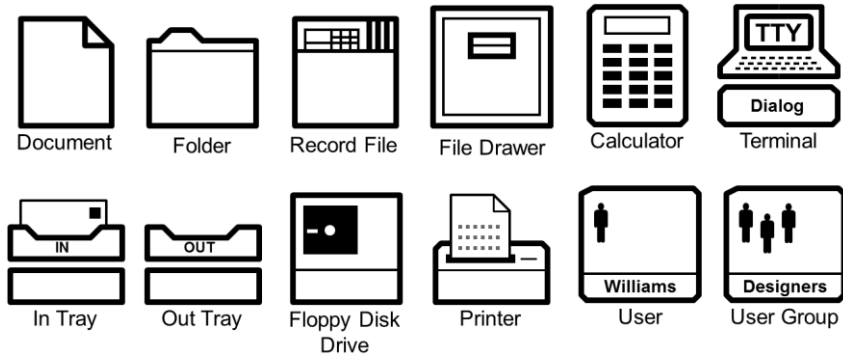
# Birth of HCI (1983)

Notable Events:

- First ACM SIGCHI Conference
- Publication of *The Psychology of Human-Computer Interaction* by Card, Moran, and Newell (1983)
- Apple *Macintosh* announced via brochures (December, 1983) and launched (January, 1984)
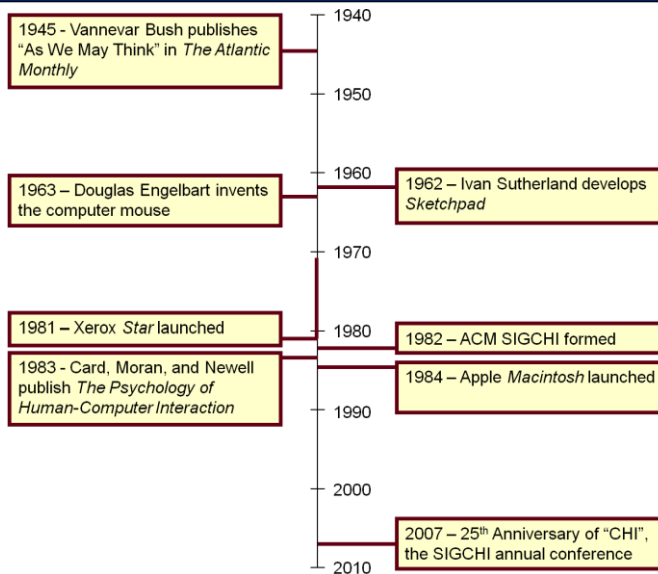- Growth of HCI and GUIs - menus

# Before & After!



**Steve Jobs – iPad (2010)**

**Alan Kay – Dynabook (1969)**



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# Significant Event Timeline

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— 1940

— 1950

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— 2000

2007 – 25th Anniversary of "CHI", the SIGCHI annual conference

— 2010

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# Today ...

# CHI Conference

## Today..



The Field of HCI
(Human Computer Interaction)

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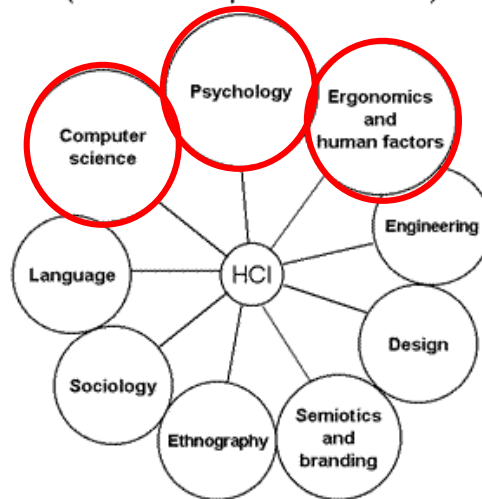
## Goals of HCI

- The goal of HCI "is to develop or improve the safety, utility, effectiveness, efficiency, and usability of systems that include computers." *(Interacting with Computers, 1989, p3)*

- Put people (users) first when designing an interface.

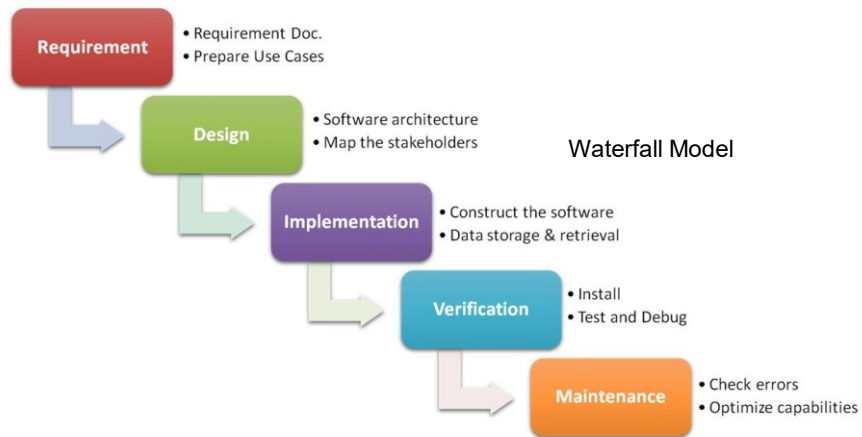- Usability: *safely, effectively, efficiently and enjoyably*
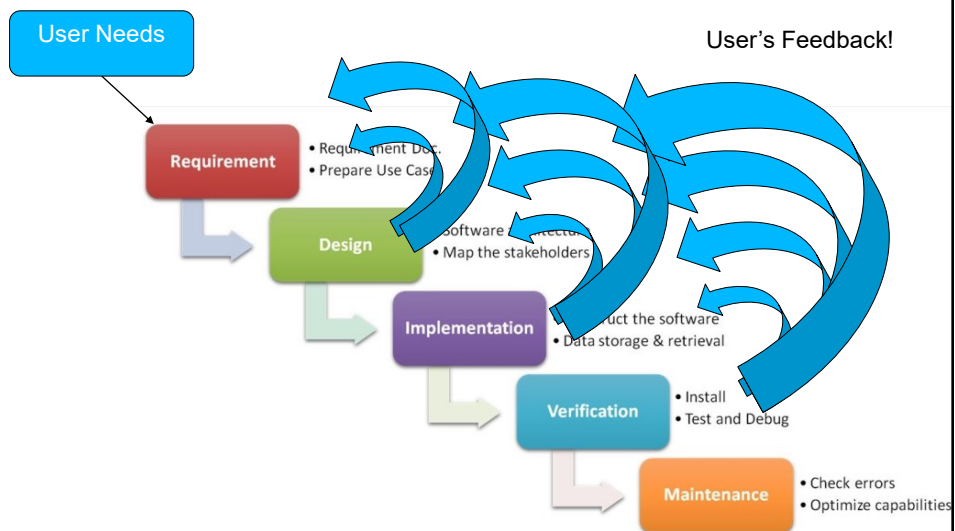
# Examples..
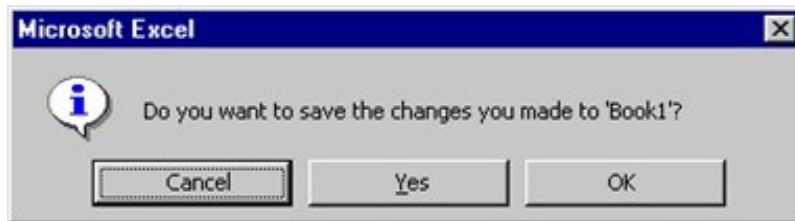
# Is HCI really important?

# Traditional Approach to Software Development



Waterfall Model

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# User-Centered Approach

## The plan for today..

- Course Website & Overview ✅

- Course Syllabus ✅

- Introduction to HCI ✅

- Historical Context ✅

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## That's it for today!

**Important Next steps:**

- **Attend next week's tutorials**
- **Complete Week 1 Discussion Question before next class**