

Assess An Existing PhD Thesis

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Sketchpad: A man-machine graphical
communication system

"It's very satisfying to take a problem we
thought difficult and find a simple solution.
The best solutions are always simple."

-Ivan Edward Sutherland

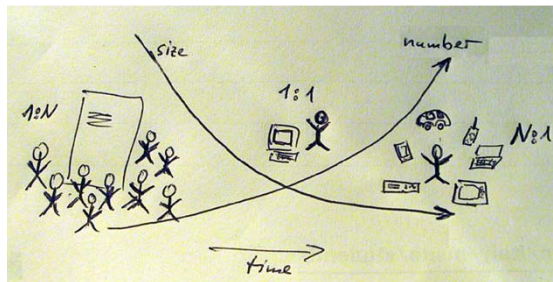
Ivan Sutherland

- Sutherland received the Turing Award in 1988, for his invention of Sketchpad and related work
- He created what is widely considered to be the first Virtual Reality (VR) and Augmented Reality (AR) Head Mounted Display (HMD) system in 1968.
- http://en.wikipedia.org/wiki/Ivan_Sutherland



What is the question of Sketchpad?

- Can a computer be “more approachable”?



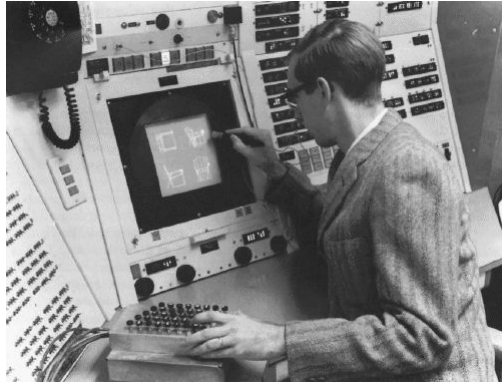
Who cares?

- Several groups in computer science
 - Graphical computer input and output
 - Computer Aided Design group
 - Artificial Intelligence group
- People who care about engineering drawings
 - Mechanical engineering
 - Electronic engineering
 - Artists

What does Sketchpad present?

- Interactive graphics
 - [Light pen](#)
 - A display file for screen refresh
- Constraint satisfaction drawing ?
- [An object oriented programming style](#)
- Hierarchical modeling ?
 - A recursively traversed hierarchical structure for modeling graphical objects
 - Recursive methods for geometric transformations
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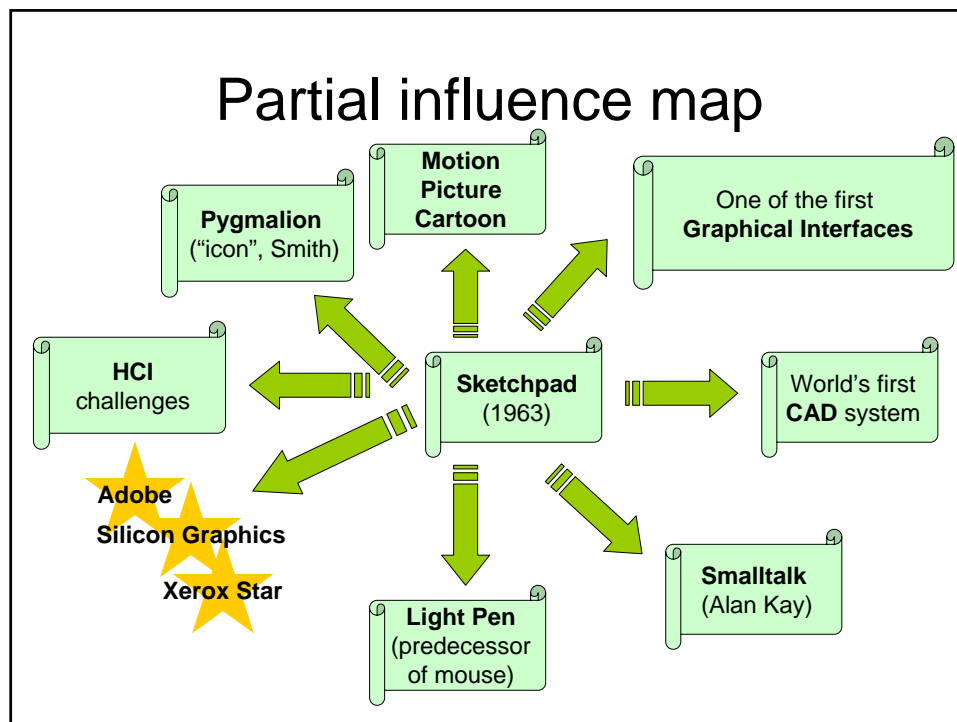
Movie of Sketchpad



Sketchpad = *topology*

Original benefits of Sketchpad, circa 1963:

- Making small changes to drawings.
- Scientific or Engineering understanding.
- Input device for circuit simulators.
- Repetition.



How did Sutherland obtain his topic?

- Seed – interest/idea
- Experience (he had been familiar with using display and light pen)
- Keen vision (he identified he had a unique opportunity to pursue his interest)
- Suggestions from professors and approaches to professors
- Sutherland made full use of resources available at MIT

Sketchpad on collaboration

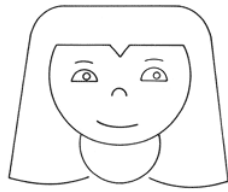
“The user group experience showed that relatively new users with no programming knowledge could produce simple drawings with the system if a skilled user prepared the building blocks necessary.” – Sutherland, *Sketchpad*

Much of what Sutherland said applies to trans-disciplinary collaboration today.

>>Alan Kay on Ivan Sutherland.

- "I once asked Ivan, 'How is it possible for you to have invented computer graphics, done the first object oriented software system and the first real time constraint solver all by yourself in one year?' And he said "I didn't know it was hard."

**"I just need to figure out how
things work."**



- Ivan Sutherland