SOCIAL NETWORKS — Sept 8 2015

LECTURE #2

HISTORY OF COMPUTING } "The Innovators" Walter Isaacson

1) ORIGIN OF COMPUTING:
- ◇ Jevons, Leibnitz, Boole, Babbage
  - → Ada Lovelace.
- ◇ Vannevar Bush → Memex
  - → Norbert Weiner, Claude Shannon
  - → John von Neumann.
- ◇ Alan Turing
  - → Alonzo Church, Steven Kleene, John von Neumann.
- ◇ Howard Eiken
  - → Mauchly, Atanasoff, Eckert.

2) ORIGIN OF DIGITAL COMPUTING.
- ◇ Konrad Zuse (Z3) Electromechanic
- ◇ Atanasoff → Mauchly, Eckert
- ◇ Turing → Colossus.
- ◇ ENIAC, EDVAC, ...

3) ORIGIN OF PROGRAMMING.
- ◇ Grace Hopper → Compiler

(Jean Jenning, Frances Bilas, Frances Holberton, Kay McNulty, Jean Bartik.

4) ORIGIN OF INTEGRATED CIRCUIT (Transistor)
- ◊ Bardeen, Brattain, Shockley
- ◊ Robert Noyce & the Traitorous Eight
- ◊ Gordon Moore & Moore's Law
- ◊ Silicon Valley
- ◊ Jack Kilby & Microprocessors.

5) ORIGIN OF DARPA NET
- ◊ J.C.R. Licklider
- ◊ Doug Engelbert
- ◊ Paul Baran - Packet Switching
- ◊ Taylor & Robert ARPANET
- ◊ Cerf & Kahn - TCP/IP.

6) ORIGIN OF AUGMENTED INTELLIGENCE
- ◊ Alan Kay - Alto SmallTalk
- ◊ Jobs & Gates - PC, Windows/Mac
- ◊ Berners-Lee, Andreesen - WWW/Mosaic
- ◊ Page, Bryn - Google

7) ORIGIN OF ONLINE COMMUNITY.
- ◊ Brand, Brilliant - The Well
- ◊ Steve Case - AOL
- ◊ Justin Hall - Weblog → Blog
- ◊ Ward Cunningham - Wiki Wiki
- ◊ Jimmy Wells - Wikipedia
- ◊ Zuckerberg - Facebook.

NETWORKS (GRAPH THEORY).

Ingredients.

$V \equiv$ Set of Actors.
$E \subseteq V \times V \equiv$ Set of Links

$S_v \equiv$ Strategy Space $v \in V$
$u_v : \prod_{v \in V} S_v \to \mathbb{R}_+ \equiv$ Pay off functions

$\Rightarrow$ Social Interactions (Strategic Interactions among Rational Agents)

$\Rightarrow$ { Graph Theory (Interaction Choices); Game Theory (Strategic Choices) }

$$\left(V, E, S_v|_{v \in V}, u_v|_{v \in V}\right)$$

together determine a Social Network.

Defn. GRAPHS (NETWORKS)

A graph $G = (V, E)$ consists of a set of vertices V together with a set of edges $E \subseteq V \times V$.

⇒ A mathematical object describing an irreflexive, symmetric binary relation on a discret set (not necessarily finite.).

Example FRIENDS

IRREFLEXIVE : One is not his own friend
$\langle v, v \rangle \notin E$ (No self-loop)

SYMMETRIC : One is a friend to a friend.
$\langle v, w \rangle \in E \iff \langle w, v \rangle \in E$

NON-TRANSITIVE: One is not necessarily a friend to a friend's friend.
$\langle u, v \rangle \in E \wedge \langle v, w \rangle \in E \not\Rightarrow \langle u, w \rangle \in E$.

Friendship relation in a social network can be described by an
UNDIRECTED GRAPH