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, Elektromechanische
     • Atanasoff -> Mauchly, Eckert
     • Turing -> Colossus
     • ENIAC, EDVAC, ...

3) ORIGIN OF PROGRAMMING
   • Grace Hopper - Compiler
     (Jean Jennings, Frances Bilas, Frances Haltiaston, Kay McNulty, Jean Backik)
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 Engelbart 
- 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, Andreason - WWW/Mosaic 
- Page, Bryn - Google.

7) **Origin of Online Community** 
- Brand, Brilliant - The Well 
- Steve Case - AOL 
- Justin Hall - Weblog → Blog 
- Ward Cunningham - WikiWiki 
- Jimmy Wells - Wikipedia 
- Turklema - Facebook.

- **Networks** (Graph Theory) 

**Ingredients**

\[ V = \text{Set of Actors} \]
\[ E \subseteq V \times V = \text{Set of Links} \]
\[ S_v = \text{Strategy Space } v \in V \]
\[ u_v : \Pi S_v \rightarrow \mathbb{R}_+ = \text{Pay off functions} \]

⇒ **Social Interactions** (Strategic Interactions among Rational Agents)

⇒ (Graph Theory (Interaction Choices)

\[ (V, E, S_v | v \in V, u_v | v \in V) \]

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 discrete 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.

$\langle u, v \rangle \in E \land \langle v, w \rangle \in E \not\iff \langle u, w \rangle \in E$.

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