A. Anda

CSCI 332 **Midterm** Spring 2003

Due Tuesday April 8 at start of common lecture

Please NEATLY type and organize your answers.

Use any resources at your disposal EXCEPT each other – if you have questions, contact only the professor (need I mention how harshly I will treat instances of unethical behavior on this exam of *ethical* issues...).

Cite your sources (including lecture notes).

1. History of technology and computers
   (a) What were the critical breakthroughs in mathematical thought which facilitated and enabled the development of the modern computer.
   (b) Alan Turing
      i. What did Alan Turing prove about the capabilities and incapabilities of a machine to compute?
      ii. Describe the abstraction of a computing machine he exploited.
   (c) von Neumann
      i. Enumerate the half dozen or so facilities and attributes which John von Neumann explained were necessary for the definition of a modern computer.
      ii. Why aren't mechanical calculators, sorters, and tabulators considered modern computers?
      iii. What relationship did von Neumann establish between his definition of a modern computer and Alan Turing's abstraction of a computing machine?

(d) Differentiate analog computers from digital computers.

(e) If all developments of modern computers are evolutionary, then for what objectives are computers improving. Give examples.

(f) Which computer language became the first standard for the publication of algorithms and was the first to be described by BNF notation? Why was it more popular in Europe than in the U.S.?

2. Technology and society

(a) What eponym do we ascribe to a person or group which is anti-technology?

(b) What historical event spawned this eponym, and what were the motivations?

(c) How does the "tulip mania" of the early 17th century relate to us today?

3. Employment

(a) What is "deskilling?"

(b) How does it effect:

i. the management structure of businesses?

ii. employment?

iii. education?

iv. Worker empowerment?

(c) What are the motivations for legal impediments and prohibitions of telecommuting from a residence?

4. Risk

(a) What is the relationship between complexity and risk and what does this imply for the future aside from any other influence? What are some influences that can contribute to offsetting this relationship?

(b) Which U.S. admiral was responsible for a complex safety critical system with an exemplary safety record? How did he do it?

(c) Describe how risk can be evaluated or even quantized. Give two examples where risk quantizations were not reported truthfully.

(d) Describe the four systemic dimensions which underly the causes of technological disasters.

(e) Describe, with examples, the four classes of technical design failures.

(f) Can positive feedback aid in failure recovery? Why?

5. Privacy

   (a) SSNs

      i. Why isn't the Social Security Number in this country an adequate universal identifier?

      ii. When should and shouldn't the SSN be used?

   (b) What are *biometrics*? What do biometrics have to do with privacy?

   (c) Big Brother

      i. Why should there be greater restrictions and protections w.r.t. government databases than for databases in the private sector?

      ii. What two categories of private sector databases have greater legal restrictions and protections?

   (d) What technological and management policies are recommended for the better protection of the privacy of information in a database you might manage?