

## CS 3001-C Computing, Society, and Professionalism (Spring 2022)

### Week 2 Section Guide

0. TA to point the section exercise (class activities) and section discussion guide links from the course website to all of the students

#### I. Questions (5 min)

- Remember each class to bring a question, observation or relevant news item for discussion

#### II. People in the Therac-25 controversy (20 min)

- Each person should present a person in the Therac-25 controversy for discussion, focusing on the questions given in Class Activity.
- Discuss key remaining people who were not picked. You don't have to discuss all of these, but continue the discussion until you feel like you have discussed key elements of the different kinds of people and all the major issues.
  - Programmer of Therac-25
  - Radiation physicists
  - Tim Still (physicist at Kennestone)
    - After first accident, contacted AECL to ask if Therac-25 could operate in electron mode without scanning to spread the beam
  - Hamilton staff who decide to add their own hardware interlocks
  - Fritz Hager (physicist in Tyler, TX)
    - worked to understand what happened
  - Frank Borger (physicist at university of chicago)
    - realizes that students entering data funny lead to hardware error on Therac 20 (but hardware interlocks prevent damage). reports to FDA
  - Operators
    - Operator in Tyler, TX remembers what she did, was able to recreate it
  - Patients
    - Kennestone patient files lawsuit against the hospital
  - Hospital management
    - Ontario Cancer Foundation is not satisfied with official response
    - Hires independent consultant
      - Consultant correctly says need hardware interlock to check turntable position
      - Forwards recommendation to AECL, who don't comply
      - Installs the interlock on their own machine
  - AECL employees
    - quality assurance manager
    - service engineer sent to investigate Ontario problem
    - people involved with first redesign after Ontario accident
      - adding fault tolerance for one microswitch failure
      - claim '5 orders magnitude' improvement in safety

- "hazards committee"
- engineer who comes to Tyler, TX
  - tells them no overdoses have been reported elsewhere
- engineers who studied 'cursor up' problem, but found no cause
- person who wrote notice to users not to use the 'up' key, with no explanation why
  - person at FDA who rejects this as unsatisfactory
- Lawyers in lawsuits
- Judges in lawsuits
- Canadian administrators at Radiation Protection Bureau (RPB)
- Members of Therac-25 users group
- Independent engineering consultants
  - Independent consultant hired by Ontario Cancer Foundation
  - Independent firm hired by Tyler, TX
- FDA official
  - required only 'pre-notification' for approval of Therac, because a 'substantially similar' product was already on the market

### III. The politics of artifacts (20 min)

- Review what was broadly the point of the Langdon Winner article.
  - Technological artifacts and social order
  - Inherently political technologies
- Ask each student should pick a technological artifact that has politics
  - Take a few (5 or less) minutes for people to think, if needed
  - Discuss each one in turn
    - Are the politics/consequences intentional or unintentional?
    - What role did designers of those artifacts play in the consequences?
    - Are the consequences different if it works well versus badly? (example: face recognition)
    - What consequences does this have for us as engineers?
      - Does it change how you go about things?

### IV. Related to HW 1: The 737 Max (20 min)

- Go through each causal factor in the Therac paper, and apply to the 737 Max if relevant
- Will you fly on a 737 MAX, once they are modified and declared fit for service?
  - Why or why not?
- What did Boeing employees do to help the situation?
- What more could employees have done?
  - Discuss this in the context of real pressures on real people