COLLEGE OF BUSINESS PEACE LEADERSHIP AND GOVERNANCE

COURSE TITLE: MPM 207 : LOCAL AND CENTRAL GOVERNANCE ICT SYSTEMS

SEMESTER 2: FINAL EXAMINATION APRIL/MAY2017

SEMESTER 2: FINAL EXAMINATION NOVEMBER 2016

LECTURER: AGRIPPAH KANDIERO

TIME: 3 HOURS

Answer **as specified in each section**.
Total possible mark is **100.**

Start **each Section B** question on a new page in your answer booklet.

The marks allocated to **each** question are shown at the end of the section.

Avoid zero-intelligible content and answer in expanded bullet point form.

Credit will be awarded for logical, systematic and neat presentations.

A1: Ethical, political legal and social issues

WHEN SOFTWARE KILLS: WHAT HAPPENED AT PANAMA'S NATIONAL CANCER INSTITUTE

Victor Garcia feels lucky to be alive. He was one of 28 patients at the National Cancer Institute of Panama who received excessive doses of gamma ray radiation for cancer treatments in November 2000. Since then, 21 of these patients have died, and the International Atomic Energy Agency (IAEA) believes at least five of these deaths were caused by radiation poisoning.

The three Panamanian medical physicists who used the software to figure out the dose of radiation for these patients were charged with second degree murder. Under Panamanian law, they may be held responsible because they introduced changes in the software that guided the radiation therapy machine used on these patients. How could this tragedy have happened?

Before administering radiation treatment, a physician devises a treatment plan that determines what dose of radiation can be safely targeted at a cancerous tumor. The plan also specifies where to place metal shields known as "blocks" to protect noncancerous areas. Using this plan, a medical physicist inputs information on the size, shape, and location of the blocks into software for guiding radiation machines. The software creates a three dimensional picture of how the dose will be distributed and calculates how long the radiation treatment should last.

The Panamanian medical physicists were following a doctor's instructions to be more protective of pelvic organs by adding a fifth block to the four blocks ordinarily used on cancer patients. However, the radiation machine software, which was created by Multidata Systems International of St. Louis, Missouri, was designed for treatments only when four or fewer blocks are prescribed.

Olivia Saldana, one of the Panamanian physicists, tried to make the software work for a fifth block. She entered the dimensions of all five blocks as a single composite shape. Although it looked like the system could work with this composite shape, the software miscalculated appropriate doses. Patients were subjected to 20 to 50 percent more radiation than they should have received.

Multidata insists that it did nothing wrong. Multidata's software manual stated it is "the responsibility of the user" to verify the results of the software's calculations. Had the hospital verified the radiation doses by manually checking the software's calculations or by testing the dosages in water before radiating patients, the staff would have found out about the overdoses before they were administered.

Unfortunately, National Cancer Institute physicists did not always manually verify the results of the software calculations. Three radiation physicists were working overtime to treat more than 100 patients per day because the hospital was understaffed. The IAEA found that the hospital examined only the functioning of the hardware. It had no quality assurance program for the software or for its results. Consequently, physicists were not required to tell anyone they had changed the way they entered data into the system and no one questioned the software's results.

By 1997, the hospital staff was so worried about radiation overdoses that it reported to the Panamanian Ministry of Health that "overexposure of radiation therapy patients due to human error" would be a risk unless conditions at the hospital improved. Independent experts not associated with the case assert that the software that controls medical equipment and other life critical devices should be designed to pause or shut down if told to execute a task it is not programmed to perform. When the IAEA investigated the National Cancer Institute incident in May 2001, it found other ways to get the software to miscalculate treatment times. Every time investigators treated one, two, or four blocks of varying shapes as a single block, the software miscalculated the treatment times.

The IAEA investigating team and a team from the M. D. Anderson Cancer Center in Houston found Multidata's manual did not describe precisely how to digitize coordinates of shielding blocks. The report also noted that the manual did not provide specific warnings against data entry approaches that are different from the standard procedure described.

Examiners from the U.S. Food and Drug Administration (FDA) who inspected Multidata in May 2001 found that Multidata had received at least six complaints about calculation errors related to the software's inability to handle certain types of blocks correctly. The examiners reported that Multidata had been aware of this failure since at least September 1992, but had not taken any corrective action. In 2003, Multidata signed a consent decree with the FDA that it would not make or sell software for radiation therapy devices in the United States, although it can sell its products abroad.

Source: Deborah Gage and John McCormick, "We Did Nothing Wrong," Baseline Magazine, March 2004; and "FDA Seeks Injunction against Multidata Systems Intl.," FDA News, May 7, 2003.

Answer the Following Questions: (USE EXPANDED BULLET POINT FORM)

1. What management, organization, and technology factors were responsible for the excess radiation doses at Panama's National Cancer Institute? **[5 Marks]**
2. Who was responsible for the malfunctioning of the system? Was an adequate solution developed for this problem? Explain your answer. **[5 Marks]**
3. Are there specific principles for conduct that can be used to guide decisions about ethical dilemmas?**[10 Marks]**

A 2: E-commerce and ICT Policy in Developing Countries

1. Outline and describe some key tenets of India's ICT policy that are not part of Zimbabwe's current ICT policy and would make an invaluable economic contribution. **[5 marks]**
2. What role can the government of Zimbabwe play in development of e-commerce **[5 marks]**
3. Outline and describe key limiting factors in the development of e-commerce in Zimbabwe? **[5 marks]**
4. E-commerce taxation is a major challenge for government outline and describe one successful e-commerce taxation model that would be applicable to Zimbabwe. It must both facilitate collection and incentivize the growth and development of E-commerce in the country. **[5 marks]**

B1 : E-Government and E-Governance

a) Differentiate between E-government and E-governance. **[5 marks]**
b) Outline and describe E-governance initiatives of the government of Zimbabwe. **[5 Marks**
c) Outline and describe the major challenges of E-Governance in Africa and recommend a solution to at least one challenge using your own country of origin as an example. **[10 Marks]**

B2 : E-commerce Concepts and Policy Perspectives

a) Outline and describe the role of government in development of E-Commerce. **(5 marks)**
b) What is a favourable policy environment for E-commerce .**(10 marks)**
c) How can government use E-Commerce.**(5 marks)**

B3: E-commerce and ICT Policy in Developing Countries

5. Outline and describe some key tenets of India's ICT policy that are not part of Zimbabwe's current ICT policy and would make an invaluable economic contribution. **[5 marks]**
6. What role can the government of Zimbabwe play in development of e-commerce **[5 marks]**
7. Outline and describe key limiting factors in the development of e-commerce in Zimbabwe? **[5 marks]**
8. E-commerce taxation is a major challenge for government outline and describe one successful e-commerce taxation model that would be applicable to Zimbabwe. It must both facilitate collection and incentivize the growth and development of E-commerce in the country. **[5 marks]**

B4 : Cloud Computing

a) Define cloud computing and outline and describe ways it can be used in the public sector making reference to your own country. **[5 marks]**
b) Outline Characteristics of Cloud Computing. **[5 marks]**
c) Outline service Models of Cloud Computing. **[5 marks]**
d) Outline possible Security/Governance Issues & Assurance challenge in the context of your own country **[5 marks]**