American International University- Bangladesh (AIUB)
Faculty of Engineering (EEE)

Course Name:	Engineering Ethics and Environmental Protection	**Course Code:**	EEE 3107
Semester:	Fall 2022-23	**Submission date:**	20-10-2022
Item:	CO1: Design solution for Ethical dilemma in accordance with professional practices (P.f.2.C6).		
Student Name:	**Nayeema Hoque**	**Student ID:**	**20-43737-2**
Department:	**CSE**	**Section:**	**N**

Marking Rubrics (to be filled by Faculty)

Category	Proficient [6]	Good [5]	Average [4-3]	Poor [2-1]	Secured Marks
Explanation of Ethical Dilemma	Dilemma /problem to be considered critically is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Dilemma /problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Dilemma /problem to be considered critically is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Dilemma /problem to be considered critically is stated without clarification or description.	
Accepted practice areas in the engineering discipline (K7)	Identifies and relates all the solutions with the accepted practice in the engineering discipline.	Identifies and relates some of the solutions with the accepted practice in the engineering discipline.	Identifies and but does not relates the solutions with the accepted practice in the engineering discipline.	Fails to identify and does not relates the solutions with the accepted practice in the engineering discipline.	
Depth of Knowledge (P1)	Specific position (perspective, hypothesis) is imaginative, considering the complexities of an issue. Limits of position (perspective, hypothesis) are acknowledged. Others' points of view and assumptions are synthesized within position (perspective, hypothesis).	Specific position (perspective, thesis/hypothesis) considers the complexities of an issue. Others' points of view and assumptions are acknowledged within position (perspective, hypothesis).	Specific position (perspective, hypothesis) acknowledges different sides of an issue.	Specific position (perspective, hypothesis) is stated, but is simplistic and obvious.	
Critical analysis with related outcomes including all factors (implications and consequences) (P7)	Extends a detail critical analysis with related outcomes including all factors (implications and consequences)	Extends a detail critical analysis with some related outcomes including all factors (implications and consequences)	a partial critical analysis with minimum related outcomes including all factors (implications and consequences)	a partial critical analysis with no related outcomes including all factors (implications and consequences)	
Valid Conclusions with innovative thinking (P3)	Valid conclusions and innovative thinking that reflect student's informed evaluation and ability to provide logical and unique solution	Valid conclusions and innovative thinking that reflect student's informed evaluation but solution is not unique.	Partially logical conclusions with some innovative thinking.	Conclusion is inconsistently tied to some of the information discussed; related outcome is not unique.	
For complete Similarity with other (Negative Marking will be imposed)					
Comments:			Total Marks (Out of 30):		

Charlie Long is an electrical engineer working for a major automobile company in the year 2001. He works in the automatic sensors department, and his job is to design and test electronic sensors for use in different parts of cars. The latest version of the Lightning-Z100 was recently launched into the national market, equipped with an electronic sensor crucial to an innovative safety feature of the vehicle. This sensor was designed and tested by Charlie's department. The Lightning-Z100's major competitor equipped its comparable model (the Bolt-Z100) with a somewhat similar sensor two years before, and it apparently was effective in reducing the number of fatalities in head-on collisions. Convinced that they could quickly come up with a design for an electronic sensor to match the Bolt-Z100's, Charlie's department committed to preparing one in time for the 2001 Lightning-Z100 model. Unfortunately, the design challenge proved to be more formidable than they expected, and they fell behind schedule. At the same time, they were under pressure to have something ready for the 2001 model. This, they were told by management and marketing strategists, could be the key to competing successfully with the BoltZ100.

So, time was short, and Charlie's department could delay its recommendation no longer. Although the prototype was not subjected to as rigorous testing as usual, Charlie's department recommended a go-ahead. Charlie was uncomfortable with this decision. He objected that more testing was needed on sensors that served an important safety function. But he was overruled, and he pressed the issue no further. Several months after the Lightning-Z100 was on the road, a disturbing set of data emerged. A very high percentage of head-on collisions resulted in the death of passengers in the Lightning-Z100, much higher than similar collisions involving the Bolt-Z100.

As Charlie thought about this, he realized that the problem could lie in the new electronic sensor. The National Highway Traffic Safety Administration (NHTSA) decided to do a detailed study of the Lightning-Z100. Although it could not determine the precise nature of the problem, NHTSA found that, for some reason, the new electronic sensor was not functioning according to the design. All the new Lightning-Z100's would have to be recalled as soon as possible in order to avoid any more deaths from malfunctioning sensors. Charlie reexamined the design. Suddenly he realized that there was a very specific design flaw. He was not sure why this realization had come to him--it would not be obvious, even to experienced electrical engineers. But there it was, staring him in the face. Further testing might have revealed this earlier, but there had not been time for that. Meanwhile, many expensive lawsuits were being pressed against Charlie's company. Called in to testify in court, Charlie had a tough problem.

Charlie is given three options to handle the scenario: Should he reveal everything (his belief that the testing was inadequate and his recent discovery) and cost the company a great deal of money? Or should he testify that he had been convinced that the testing was adequate? Should he keep it to himself that he now knew that there was something wrong with the design? Your task is to answer the following questions:

1. **Describe clearly the Moral clarity and Necessary critical information needed for analyzing the case in two paragraphs.**
2. **Select a feasible ethical solution from the given choices with proper justification.**

Question 1:

Moral Clarity and Necessary Critical Information: Moral clarity is the process of knowing and identifying relevant moral values. It often asks about the core issue(s) that are raised and the relevance between the issues, the safety of society and the benefit of the company. In the above topic, the core issue is the flaw in the design of the new sensor and the lack of testing which made it impossible to detect the flaw in the early stage. If the issue becomes public, the company will lose enormous amounts of money, also possible loss of their business license and most importantly, people's trust. For any employee, the company's interests come first but, in this scenario, if the core issue stays hidden, those who suffered the consequences may not get the compensation they deserve. Also, the company may be reluctant to adopt a more robust safety inspection in the future.

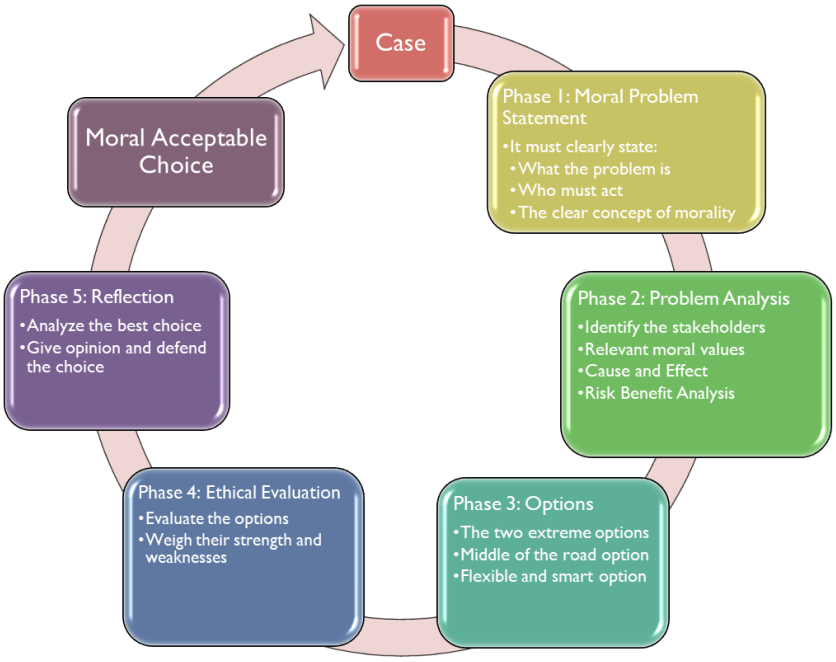
In terms of the necessary information, the sensor is a very important and critical component of the car. The sensor can save or take numerous lives which means its efficiency and success rate are enormous in terms of public safety and health. Because of the competition, there was less time to conduct every test and as a result, one critical flaw was present in the design of the sensor. Multiple lives were lost as the sensor failed to work properly. If the company's negligence is proven, it may lose a huge amount of money as multiple high-value lawsuits were filed.

Question 2:

Choice: I would choose the first option where Charlie will reveal everything and cost the company a lot of money.

Justification: The sensor itself is a very critical piece of equipment, as it failed, multiple human lives were lost. Even though an engineer is expected to be loyal to the company, for any employee or engineer, human safety should come first. The safety of the public should be the highest priority when it comes to designing and testing equipment. Also, if the issue isn't revealed, those who suffered the consequences won't be able to get their deserved compensation. The company needs to understand the importance of testing and by revealing the issue, it will be forced to make changes. This will also send an important message across the industry and hopefully, people will be a bit more cautious.

Using the below five-step analysis technique of resolving Ethical / Moral Dilemma in this case from the concept of IEEE Code of Ethics (i.e. that how they should act Ethically and handle the situation with some proposed solutions and finally which solution they adopt). **You have to explain clearly the five steps with the necessary description. Write about the Moral Clarity and Justification of your final choice of option to solve the case from the Perspective of the IEEE Code of Ethics.**



Phase 1, Moral Problem Statement:

According to the IEEE Code of Ethics, the first phase represents the problem statement, the protagonist and the moral dilemma surrounding the issue. In the above topic, the main problem is the use faulty sensors which led to multiple fatal injuries and lives. During the test period, proper tests were not conducted, and the suggestion of a stakeholder was ignored in terms of safety. Now the company is being investigated and multiple lawsuits have been pressed against the company. Charlie Long is the main protagonist who has to choose between three options but in a moral dilemma.

Phase 2, Problem Analysis:

The second phase represents the stakeholders relevant to this case and their interests, cause and effect of the various actions. The company where Charlie Long works is the principal stakeholder in this topic. The company made the scanner. The higherups from the company didn't take Charlie's warning into account. As a result or effect of that action, various fatal accidents happened. The company's primary interest is to minimize the damage and the loss by any means necessary. They will want the lawsuits to be dismissed. On the other hand, the deceased and their relatives are other stakeholders who will expect the company and those who responsible will be punished.

Phase 3, Options:

The third phase represents all the possible options that can be taken. There are 3 options given in the question. The 1st one is to reveal everything even if it costs the company a lot of money. The 2nd option given is to lie to the investigation that the tests were adequately done even though they were not. The 3rd option is to keep the design flaw information to himself.

Phase 4, Ethical Evaluation:

The fourth phase represents the evaluation of the given or available options and all their positives and negatives. From the given options, the last two options are much more unacceptable morally. Even though, the last two options would be able to save the company from the enormous loss and possible ban from selling vehicles, choosing these two options means, those who suffered will not be able to avail their justice, those who lost everything will not be able to get their deserved compensation. Those who were responsible for the accidents will not be judged. Most importantly, their mistakes will not be sorted out.

Phase 5, Reflection:

The fifth phase represents the best option and justification for the choice. Out of all three given options or choices, I will choose the first one where Charlie reveals everything. As discussed in the fourth phase, it is very important that, for any engineering related work, people's safety should be the first priority. Ignoring that by not properly conducting tests is a serious violation of ethical standards and rules set by IEEE. It is also important to make sure that justice is served to those who deserve it.