Solutions for Homework7

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Abstract

In this document we will show the solutions for problems represented in the given homework for this week.

Contents

1 Theoretical Problems

1.1 Part 1.

1.1.1 Question

1. Your company has been granted a contract to develop the next generation of electronic cigarette, also known as a "nicotine delivery system," and you have been assigned to the design team. Can you in good conscience contribute your expertise to this project? Write in details: issues, stakeholders, consequences action you might take
2. Choose **one** of the following industries then:
   (a) Apply the four-step ethical decision-making procedure to gain insight into the nature of the decision to be made
   (what the issue and who is effected by the alterntives, alternatives from other prespectives and their correlation, suggest an action)
   (b) Give at least one more ethical issue in the indutry you choose

   Choose one:

   (a) Food processing industry (one issue Excess use of (fat/sugar/salt))
   (b) International manufacturing companies (one issue poor labor practice in other countries)
   (c) Various chemical industries (one issue Pesticide effect on ecosystem)

1.1.2 Solution

1. (a) Step 1: Identify and see if there is a problem, and if who is affected by it.

   - Issues:
     - Nicotine is very addictive and detrimental for your body.
     - This device / product might misdirect a lot of people into thinking that it will help them to stop smoking while in reality it could be worse.
     - Health care lawsuits / Protests against the product.
     - If this product becomes popular, there will be a huge decline in tobacco sales.
     - Refusing to make this product can get you fired.
     - Halting the production can cause huge money loss.
   - Stakeholders:
     - Nicotine addicts that are trying to recover
     - The User
     - Young people
     - The company
     - Tobacco farmers
     - You

   (b) Step 2: Analyze alternative courses of action from different perspectives.
   - Consequences:
     - Future lawsuits will come.
     - You might lose your job.
     - A lot of people might develop health problems
   - Intent:
     - People who struggle with nicotine addiction should **NOT** use this product.
     - People who use this device risk getting addicted to nicotine.
     - People might overcome their tobacco addiction.
     - The company will make a lot of $$$
   - Character
     - Person of good character would **NOT** condone the use of this device.
     - Person of good character **COULD** use this device without damaging their reputation.
     - My spiritual leader would **NOT** condone the use of this device.

(c) Step 3: Correlate perspectives.

- While it is true that this device can help people resolve their smoking addiction, it will still affect the consumers health because nicotine is poisonous. This device doesn't benefit people who are non smokers, nor does it do good for the company because of the legal lawsuits it would face from all the health concerns.

(d) Step 4: My decision

- I do NOT condone the use of this device for the soul reason that it has more negative over positives, and all the positives it has all come with their side-effects.

2. Food processing industry (one issue Excess use of (fat/sugar/salt))

(a) Step 1: Identify and see if there is a problem, and who is affected by it.

- Issues:
  - Health problems
  - Possible lawsuits
- Stakeholders:
  - Young children
  - Industry food consumers
  - Students (Because no $$$, can't get good food :(spent it all on my car)
  - Company

(b) Step 2: Analyze alternative courses of action from different perspectives:

- Consequences:
  - Diabetes
  - Heart problems
  - Sugar Rush
  - Kidney problems
- Intent:
  - Young kids should not be given food with too much sugar, because it has a high probability of giving them a sugar rush.
  - People should not consume food with a lot of fat, because it increases the chance of a heart attack.
- Character:
  - Person of good character would NOT condone the selling of food products with high amount of salt,sugar, or fat.
  - Person of good character would NOT sell these products.

(c) Step 3: Correlate perspectives.

- Products that have an excess amount of fat/sugar/salt are extremely cheap, and very damaging to a person's health.

(d) Step 4: My decision

- I do NOT suggest consumption nor selling of products with excess amount of fat/sugar/salt do to their high levels of risk to health.

1.2 Part 2.

1.2.1 Question

1. For a 14 minutes oral presentation, how would you allocate the time for introduction, body and conclusion
2. List some recommendations related to oral presentations
3. List some body language related aspects of oral presentation

1.2.2 Solution

1. 2 minutes on introduction, 10 minutes for the body, and 2 minutes for the conclusion.
2.
   - Be excited.
   - Speak with confidence.
   - Make eye contact with the audience.
   - Avoid reading from the screen.
   - Blank the screen when a slide is unnecessary.
3.
   - Make sure you look at everyone
   - Do not be tense
   - Be adaptable
   - Smile
   - Interact with the audience
   - Speak clearly

1.3 Part 3.

1.3.1 Question

Fix the following texts to look more professional

- The manager at the company discussed the project of the construction with the engineer of the contract.
- Mechanical engineers designed vehicles, develop heating system, and drawing machine parts
- The following skills are used by engineers analysis creativity and communication

1.3.2 Solution

- The manager of the company discussed the construction project with the engineer in charge.
- Mechanical engineers work on designing the vehicles, developing the heating systems, and sketching needed machine parts.
- Analysis, creativity, and communication skills are used by engineers.

1.4 Part 4.

1.4.1 Question

1. What are the steps in designing a solution to a problem?
2. What are the constraints faced in designing solution for engineering problems?

1.4.2 Solution

The steps in designing a solution to a problem are:

1. Define the problem;
2. Generate concepts;
3. Develop a solution;
4. Construct and test the prototype;
5. Evaluate the solution(if not valid go to step 3);
6. Present the solution;

The biggest constraints faced in designing solutions for engineering problems are design limitations, available budget, resources, manpower, and time.

1.5 Part 5.

1.5.1 Question

An engineer works at an automobile manufacturing facility. His tests show that there is 1% probability that the brake system might fail. He informs his manager of his findings. However, his manager stresses the importance of shipping the new automobiles on time because any more delays in production will cause massive financial losses. He asks the engineer to ignore the test results and concentrate on meeting the delivery deadlines.

1.5.2 Solution

While no question here was asked, we are guessing this has to do with the choice that the engineer should make. Here it is a classical ethical question if the engineer should push this product. If the engineer does not push out the product in time he will cause a huge financial loss to the company which will most likely lead him to getting fired, on the other side if he does push this product he will be putting a lot of peoples lives at risk. So the engineer should NOT push this product out.

1.6 Part 6.

1.6.1 Question

Choose and explain your choice of major, and the type of job you envision yourself doing in 15 years. Consider the following:

a) What skills or talents do you possess that will help you succeed in your field of interest?

b) How passionate are you about pursuing a career in engineering? If you do not plan on being an engineer, what changed your mind?

c) How confident are you in your choice of major?

d) How long will it take you to complete your degree?

e) Will you obtain a minor?

f) Will you pursue study abroad, co-op, or internship?

g) Do you plan to pursue an advanced degree, or become a professional engineer (PE)?

h) What type of work (industry, research, academic, medical, etc.) will you pursue?

1.6.2 Solution

a) I am a very fast learner.

b) I am very passionate about pursuing a career in engineering.

c) I am extremely confident in my choice of major.

d) It will take me around 4-5 years to get my degree.

e) I will probably not obtain a minor.

f) I would like to go to an internship abroad. I would love to work at google.

g) I am planning to get a master's degree in software engineering.

h) I will pursue any work I can get. Preferably in the industry.

1.7 Part 7.

1.7.1 Question

Read the essay "Engineering is an . . . itch!" in the Engineering Essentials introduction. (chapter 1) Reflect on what it means to have performance-focused versus mastery-focused learning goals.

a) Describe in your own words what it means to be a performance-based learner compared with a mastery-based learner.

b) What learning goals do you have? Are these goals performance based or mastery based?

c) Is it important to you to become more mastery focused?

d) Do you have different kinds of learning goals than you had in the past, and do you think you will have different learning goals in the future?

1.7.2 Solution

a) For me to be a performance-based learner is to learn something as much as possible. Not because I love it, but because I will get something in return. While the mastery-based learner is interested and passionate about what he is learning.

b) My learning goals are to learn as much as possible about computers and they are entirely mastery-based.

c) Yes it is important to me to become more mastery focused.

d) I had always the same learning goals and I think they will stay the same in the future.

1.8 Part 8.

1.8.1 Question

Determine the density and specific gravity of a rock.

1.8.2 Solution

To calculate the rock density you need to divide the mass of the rock by its volume. The latter can be determined by placing the rock into a graduated cylinder filled with water.

1. Select a rock sample with an approximate weight of $20 \rightarrow 30g$.
2. Weigh the rock on the scale; for example, the rock mass is $20.4g$.
3. Fill the graduated cylinder approximately half full with water. Then determine the exact water volume using the cylinder scale. For example, you may put $55ml$ of water in the cylinder.

4. Put the rock into the graduated cylinder making sure that your sample is completely covered with water. Note that the water level will rise.

5. Determine the volume of the water in the graduated cylinder again; for example, the volume after placing the rock is $63ml$.

6. Subtract the initial volume (Step 3) from the final volume in the cylinder (Step 5) to calculate the volume of the rock. In our example, the rock volume is $63 - 55$ or $8ml$.

7. Divide the mass of the rock by its volume to calculate the density of the rock. In our example, the density is $\frac{20.4}{8} = 2.55\frac{g}{cm^3}$.

To calculate the gravity of the rock, divide the rock density by the density of water to calculate the specific gravity. Since the water density is 1 g/cubic cm (at 4 Celsius) then the specific gravity in our example will be $\frac{2.55\frac{g}{cm^3}}{1\frac{g}{cm^3}}$ or 2.55.

1.9 Part 9.

1.9.1 Question

Choose a topic that you like, read, find or make an experiment or a report about it then:

1. Write a memo to a manager

2. Write a short report to a customer

3. Plan a poster to your friends (don't make it, just make a plane for it)

4. Plan a presentation about the topic, again, don't make it, just the outline and the plan of the presentation

1.9.2 Solution

Selected topic: Write a memo to a manager

Memo To My Manager

To: Emre Arapcic-Uevak
From: Vedad Siljic
Subject: Software Engineering Seminar -28 December
Date: 25.11.2022.

I recently received information regarding a software engineering seminar at the end of December this year, and I would like the whole team to attend. As a lead developer, I feel that it is vital to stay up-to-date with the latest news, and information, to help us to make our scripting language IUScript better. Doing so enables us to continually grow, in turn giving the best possible outcomes for our project. I would appreciate it if you could agree for the whole team to go to this seminar by the end of this month so that I have enough time to book my space. I look forward to hearing from you.

Vedad Siljic
Lead Software Engineer
Vedad_Siljic@ius.com

2 Octave Problems

2.1 Part 1.

2.1.1 Question

Assume a matrix named **Prod** contains data on production of various electronic devices at your company during several years. Each row of the matrix contains production data for a single year. The first element in each row contains the year, e.g., 2007 or 10012. The remaining elements in each represent the number of a specific part manufactured during that year. For example, the second element might contain the number of 2N3904 transistors produced during each year, whereas the fifth column might contain the number of IC555 timer chips produced. Write a single line of code to answer each of the following questions. You may use the results of any question to answer subsequent questions if desired. A sample **Prod** matrix is provided online. Note that your solution must work for any properly formatted matrix **Prod**.

a. Create a row vector **TotalProd** that contains the total number of years in the first element and the total number of each item produced during all listed years in the remaining elements.

b. Create a row vector **AvgProd** that contains the total number of years in the first element and the average number of each item produced during all listed years in the remaining elements.

c. Create a two-column matrix **YearProd**. The first column should contain the same years as those in the first column of Prod, and the second column should contain the total number of all units produced during each year.

d. Create a two-column matrix **MaxProd**. Determine the maximum number of any type of device produced during each year and place the results in the second column of the corresponding row in **MaxProd**.

e. Determine the maximum number of any device produced during any year and place the result in the scalar **OverallMax**

f. If your company makes a profit of one-fifth of one cent on each device produced, regardless of type, determine the total profit made during all listed years and place the result in **Profit**. Your result should be in dollars.

2.1.2 Solution

```
clc
ProdNames = {"NpN103Trans", "MCchip3001", "IUScriptCore"}
Prod = [2007 68 410 96; 2008 0 0 0; 2009 10 9582 9999; 2010 6402 10 400]

totalProd = [length(Prod(:, 1)), sum(sum(Prod(:,2:end)))]

avgProd = [length(Prod(:, 1)), mean(Prod(:,2:end))]

yearProd = [Prod(:, 1), sum(Prod(:,2:end)')']

maxProd = [Prod(:, 1), max(Prod(:, 2:end)')']

overallMax = max(max(Prod(:, 2:end)))

profit = totalProd(1,2) / 500
```