

***KING ABDULAZIZ UNIVERSITY***

***FACULITY OF ENGINEERING***

***Subject: IE 201 (52405) (11)***

***Instructor: Eng. Khalid Aljohani***

***L2. Design notebook***

***Team# 4***

***2021\12\9***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
| *1937830* | *Abdullah Mohammad Babader* | *4* |
| *2046405* | *Osama Ahmad Alfifi* | *5* |

|  |  |
| --- | --- |
| **Team’s website** | **Team’s Email** |
| **<https://2u.pw/AY1QZ>** | Pioneersteam4@gmail.com |

**Presentation of Technical work Checklist**

Evaluation of Team Four ‘s Work Product: L2. Design Notebook

1. Work Evaluated by Team Four Assessment Symbol/Color Green Date 2021\12\9
2. Work Evaluated by Assessment Symbol/Color Date

The following Checklist can be used to assess anybody of technical work to make sure the work is being presented according to the expectations of the IE 201 faculty. This Checklist is referred to in all the other Assessment Checklists that you will be using and, while you may not actually print and fill in this Checklist for all of your work, you will need to at least mentally complete this Checklist for **all** of your work

| **Yes** | **No** | **Expected Features** |
| --- | --- | --- |
|  |  | 1. There is material (i.e., a **Context**) at the start of the work which marks the **beginning** of the new work and **orients** the reader (i.e., gives the reader some sense of what follows)? This material should include:    1. tells the reader how this work fits into a bigger problem (e.g., Every successful project in life should follow certain quality rules and regulations.),    2. explain why the work will be/was done (e.g., This is a homework assignment on equilibrium or This work on frame weight will be undertaken to get a better idea about how much this Home Exercise Machine might weigh; I prepared this memo on our power shortages after last Friday’s power outage at Unit 67),    3. tells the reader what will be accomplished when the work is done (e.g., After this assignment is completed, I will have shown I know how to do force balances and will be prepared for the quiz or when this work is completed, we will know the frame weight), and    4. tells the reader the important topics to follow and the order the topics are addressed (e.g., This report first discusses the methodology used, then presents the test results, and ends with a discussion of the testing) |
|  |  | 1. There are dates and names of the people who did the work on at least the first page of the work |
|  |  | 1. The work looks professional (e.g., the material is readable, font is 12 pt., neat, plenty of white spaces, figures and plots are numbered and have descriptive titles.) |
|  |  | 1. Based on the Context, the work is what you expected to see |
|  |  | 1. The work is professional and ethical |
|  |  | 1. There is material (i.e., **Discussion**) at the end of the work, which marks the **end** of the work and **discusses** or **reflects** on the work done. This end material could discuss:    1. what was learned (e.g., The frame weight was 34 kilograms which is much lighter than any machine we have found in the stores or This cone surface area of 250 m2 is huge, about a third of a football field),    2. the process used in working the problem (e.g., I could not work this problem until I realized I could replace 1 with sin2Θ + cos2Θ or until we simplified the frame, we were not able to get our model to converge),    3. the correctness of the result (e.g., The answer to this problem is 14.6 m2, which matches the answer in the back of the book or This weight of 34 kilos, while it seems light, is probably correct; the model was checked using example problem 4.5 in Shigley), and    4. what will happen next (e.g., Now we can calculate the cost of our device) |

**Results of Assessment**

|  |  |  |  |
| --- | --- | --- | --- |
| **M** | **NI** | **NCE** | **Presentation of Technical Work**   1. **M**, meets expectations, requires **all** Yes’s for items 1 to 6 2. **NI**, needs improvement, is given if there are any No’s for items 1 to 6 3. **NCE**, no credible effort, is given if there is little to no work to be assessed (1 SR-Fault charged) |

Team Four's Work Products Being Evaluated:  **Design Notebook Structure**

1. Work Evaluated Team Four Assessment Symbol/Color Green Date 2021\12\9
2. Work Evaluated by Assessment Symbol/Color Date
3. Work Evaluated by Assessment Symbol/Color Date
4. Work Evaluated by Assessment Symbol/Color Date

| **Yes** | **No** | **Expected Features** |
| --- | --- | --- |
|  |  | 1. This checklist has been completed by the team prior to peer assessment |
|  |  | 1. The Title Page is present on the cover, backbone, and the first page seen when the Notebook is opened up |
|  |  | 1. The Title Page shows the Team’s number (e.g., Team #1) |
|  |  | 1. The Title Page lists all the team members names and IDs. |
|  |  | 1. The Title Page includes the course number and name |
|  |  | 1. The Title Page has the laboratory course instructor’s name |
|  |  | 1. The Title Page has an e-mail address at which the team can be reached |
|  |  | 1. There is a Table of Contents (TOC) |
|  |  | 1. There are tabbed section dividers with section names on them for at least Project 1, Team Meetings, Assessment, and Index |
|  |  | 1. The TOC shows **all** the sections (i.e., all the divider titles)? |
|  |  | 1. The Presentation of Technical Work Checklist, and Zeroth Notebook Assessment Checklist are in the Assessment Section of the Design Notebook |
|  |  | 1. All the items in Design Notebook are shown in the TOC |
|  |  | 1. All teammate interviews (#L1) are Meets and are in the Team Meetings Section |
| Comments on any of the No’s | | |

Results of Initial Assessment

|  |  |  |  |
| --- | --- | --- | --- |
| **M** | **NI** | **NCE** | **Design Notebook Structure**  **M**, meets expectations, requires **all** Yes’s for items 1 to 13  **NI**, needs improvement, is given if there are **any** No’s for items 1 to 13  **NCE**, no credible effort, is given if there is little to no work to be assessed |

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# Assignments

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**L1. Team Interview**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
| *1937830* | *Abdullah Mohammad Babader* | *4* |
| *2046405* | *Osama Ahmad Alfifi* | *5* |

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**L5. Team Norms**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
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**L3.a**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
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| *2046405* | *Osama Ahmad Alfifi* | *5* |

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**L4.1 Team process**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
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| *2046405* | *Osama Ahmad Alfifi* | *5* |

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**L3.b**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
| *1937830* | *Abdullah Mohammad Babader* | *4* |
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**L3.c**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
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| *2046405* | *Osama Ahmad Alfifi* | *5* |

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**L3.d**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
| *1937830* | *Abdullah Mohammad Babader* | *4* |
| *2046405* | *Osama Ahmad Alfifi* | *5* |

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**L3.e**

***Team# 4***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
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| *2046405* | *Osama Ahmad Alfifi* | *5* |

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# ExercisesA picture containing text, clipart Description automatically generated

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***`1. Calculate the volume of the building***

**Team 4**

**Saad Alhassan**

**Sulaiman Alahmadi**

**Bader Algamdi**

**Abduallah Babader**

**Osama Alfifi**

In the beginning, every company requires some measures to do their work. So, our group volunteered to do the companies work.

The company's requirements are length, width and height, so that they can evaluate the volume of the building. To this work we need some gadgets and resources to take these measures.

Starting with Google earth we've managed to take the building's area, the following picture is taken by our member Osama AL-Fifi



Then, we measured the height of each floor with the measure app by Apple to be more accurate.

After using the available resources we have, we've gathered information about the building, it was:

Ground floor height: 2.9m

First floor height: 2.86

Excess part between the two floors: 2.06

Total heights: 7.82

Area: 1795m2

Using the previous measurements we calculate the volume using this formula:

Volume = Area x Height

Volume = 1795 x 7.82=14.037m3

**Discussion**

In this mission, the team learned many useful things that will help us in the future. One of the most important things is learning how to work as a team and how to write an introduction, main body, and discussion. One of the issues the team had was how to take building measurements without using any equipment, and we solved that problem using Google Earth and the Measure app. In this problem, we found that the volume of building 41A is 14.037m3 approximately, however, these measurements are not considered to be accurate and must be recalculated using professional tools. Now, after calculating the volume of the building, the measurements will be delivered to the company responsible for this project to complete the conditioning procedures.

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***2. Dropping the Tomato***

**Team 4**

**Saad Alhassan**

**Sulaiman Alahmadi**

**Bader Algamdi**

**Abduallah Babader**

**Osama Alfifi**

***Diagram

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***3. Flowchart KAU registration***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

**Diagram

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***4. Your First Car***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **KT Decision Analysis** | | Alternative: | | | | | | | | | | | |
| Musts | | **A :** **Toyota Camry** | | **B:** **Chevrolet Malibu.** | | **C:** **Hyundai Sonata.** | | **D :Mercedes-Benz C Class** | | **E :** **BMW 335i** | |  | |
| 1.The cost doesn’t exceed 95K SR  2.The gas type must be regular     3..The  Fuel Tank Capacity must be 15.0 or more  4.4.Fully airbag system    5. Spare Tire and Wheel are exist    6. The engine must include turbocharger   7.The warranty of the Powertrain must be 60 months/60K mi or more | | **GO** / **NO** GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO**/ **NO** GO     **GO**/ **NO** GO | | **GO** / **NO** GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO**/ **NO** GO     **GO**/ **NO** GO | | **GO** / **NO** GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO**/ **NO** GO     **GO**/ **NO** GO | | **GO** / **NO** GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO**/ **NO** GO     **GO**/ **NO** GO | | **GO** / **NO** GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO / NO**GO     **GO**/ **NO** GO     **GO**/ **NO** GO | | ~~X~~ | |
| Wants | Weight | Rating | Score | Rating | Score | Rating | Score | Rating | Score | Rating | Score |  |  | |
| 1.Red color | 10 | - | - | 10 | 100 | - | - | - | - | - | - |  |  | |
| 2.Sunroof | 8 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 3.Fog/Driving Lights | 8 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 4.Cruise Control | 8 | - | - | 10 | 80 | - | - | - | - | - | - |  |  | |
| 5.12-Volt DC Power Outlet | 7 | - | - | 5 | 35 | - | - | - | - | - | - |  |  | |
| 6.  Equalizer | 6 | - | - | 8 | 48 | - | - | - | - | - | - |  |  | |
| 7.  Cooled Front Seats | 6 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 8.  Memory Seats | 6 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 9.  Leatherette seat | 6 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 10. Glovebox Light | 5 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
| 11 compass | 2 | - | - | 0 | 0 | - | - | - | - | - | - |  |  | |
|  |  | ***Total A =  -*** | | ***Total B =263*** | | ***Total C =  -*** | | ***Total D =  -*** | | ***Total E =  -*** | |  | |  |

**Adverse Consequences Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Chevrolet  Malibu | 1. Poor heat resistance | 6 | 8 | 48 |
| 2. Poor brake performance | 4 | 10 | 40 |
| 3. Bad car company agent | 7 | 8 | 56 |
| 4. unavailability of spare parts | 5 | 9 | 45 |
| 5. Lack of safety means | 5 | 10 | 50 |
|  |  |  | Total Threat | 239 |



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***5. KT SA Exxon Valdez Problem***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ***Situation Analysis*** | | | |
| **Situations / Problems / Projects** | **Timing**  (H,M,L) | **Trend**  (H,M, L) | **Impact**  (H,M, L) | **Process**  (PA ,DA, or PPA) |
| **1.Spilling oil at an enormous rate** | H | H | H | PA |
| **2**.**The second tanker be dispatched** | H | L | M | DA |
| **3.the number of compartments from which oil is leaking is not known** | H | M | H | PA |
| **4.chemicals under water would be taken by the fish** | M | H | H | PPA |
| **5.** **there is not enough boom material to begin to surround the slick** | H | L | H | DA |
| **6. the oil reaching Bligh reef** | L | H | H | PPA |
| **7.** **material should be used to surround the shore**  **of a small village** | H | H | H | DA |
| **8.no enough boom material to surround the slick** | H | L | H | DA |
| **9.** **channel the slick movement in the fjord** | H | H | M | DA |
| **10.**  **fish were scheduled to be released from the fisheries into the oil contaminated fjord two weeks from now** | L | M | H | PPA |

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***KING ABDULAZIZ UNIVERSITY***

***FACULITY OF ENGINEERING***

***Subject: IE 201 (52405) (11)***

***Instructor: Eng. Khalid Aljohani***

***6. Solar Car Race***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

****

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***FACULITY OF ENGINEERING***

***Subject: IE 201 (52405) (11)***

***Instructor: Eng. Khalid Aljohani***

***7. Food for Thought***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

**0-30 min**

**30- 55 min**

**30-50 min**

***Serving and eating apple pie***

***Serving chicken with green tea and eating***

***Serving and eating soup***

**10-55 min**

**55-70 min**

**55-95 min**

**Total time to end this process is 110 min**

**Cooking onion soup**

**Cooking chocolate sauce**

**Boiling vegetables**

**95-110 min**

**55-80 min**

**0-10 min**

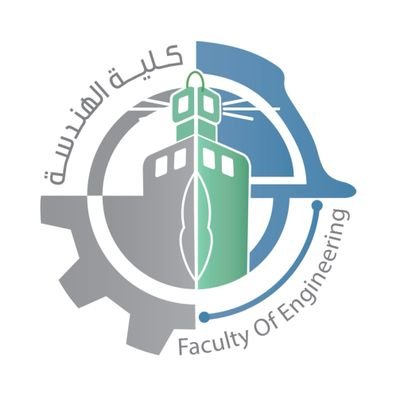
**Warming pie in oven**

**Roasting chicken in oven**

**Warming the bread in the oven**

**20-55 min**

**Preparing Green tea**



***KING ABDULAZIZ UNIVERSITY***

***FACULITY OF ENGINEERING***

***Subject: IE 201 (52405) (11)***

***Instructor: Eng. Khalid Aljohani***

***8. Ethics Case***

***Team# 4***

***2021\11\26***

|  |  |  |
| --- | --- | --- |
| ***ID*** | ***Name*** | ***Member*** |
| *2142594* | *Saad Salaheddin Alhassan* | *1* |
| *2135582* | *Sulaiman Fahad Alahmadi* | *2* |
| *2135469* | *Bader Sultan Alghamdi* | *3* |
| *1937830* | *Abdullah Mohammad Babader* | *4* |
| *2046405* | *Osama Ahmad Alfifi* | *5* |

|  |  |
| --- | --- |
| **Team’s website** | **Team’s Email** |
| [**https://2u.pw/AY1QZ**](https://2u.pw/AY1QZ) | Pioneersteam4@gmail.com |

**“Ethics Case” Checklist.**

Name: Team Four Sec #11 Team4 Member: All members

1. Work Evaluated by Team Four Assessment Symbol/Color Green Date 2021\11\26
2. Work Evaluated by Assessment Symbol/Color Date\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Yes** | **No** | **Self-Regulation Issues** |
|  |  | 1. The assignment was submitted on time |
|  |  | 1. The top sheet of the submitted assignment was this checklist with the top row completed |
|  | | Enter a 1 (one) in the cell to left if any of the items listed above are marked as **No** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Yes** | **No** | **Expected Features** | | |
|  |  | 1. The assignment follows the Presentation of Technical Work Checklist (**PTWC**). | | |
|  |  | 1. The KTDA is used correctly with at least 4 Musts and 6 Wants. | | |
|  |  | 1. The Adverse Consequences of the decision are presented. | | |
|  |  | 1. No mistake exists in KTDA table and in Adverse Consequences Table. | | |
|  |  | 1. The final decision is discussed. | | |
|  |  | 1. The Team reached an Ethical decision. | | |
|  |  | 1. Each page in the assignment is numbered, has left, and right margins. | | |
| Discuss any No’s for Expected Features | | | | |
| **Wow** | **Ok** | **Weak** | **Revealed Features** |
|  |  |  | Rate the quality of the Presentation Sandwich structure |
|  |  |  | Rate the quality of the Discussions (Rationale of defining weights of wants, discussions for identifying the best ethical solution etc.). |

**Results of Tutorial Assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **M** | **NI** | **NS NCE** | **SR-Lapse** | **M**, no No’s and at most 1 Weak  **NI**, any No and/or two Weaks  **NCE**, what was submitted does not reflect a credible effort  **NS**, no tutorial materials were submitted |

**King Abdelaziz University IE201 Faculty of Engineering Date: 26/11/2021 Instructor: Khalid Aljohani Section: 11 Team Four**

**Ethics**

# Context

Could you live a life with a continuous pang of conscience? What is your feeling when you do unethical actions? Living under these conditions is a tough thing. One of the main goals of IE201 is to graduate students that have the highest value of integrity and manners. As a result, we were assigned to do this exercise in order to learn how can an engineer do his job with full integrity and follow the company system and roles. By the end of this exercise, we will learn how to have the engineer's ethics and manners. Also, we will learn how to combine integrity with work. To reach these aims, we will do a Kepner Trego Decision analysis for the alternatives in the IE201 file after establishing the constraints and desires. Following that, an adverse consequence will be written. Finally, we will choose our alternative. [1]

# The Body

To choose the best alternative we will go to the IE201 website and bring the alternatives from 1 to 10 which will be presented in the following blank. Notice that the alphabet 'A' represents the word "Alternative".

**A1**: Charlie Howe and your manager are correct. Unsubstantiated gossip heard at a lunch counter does not belong in an engineering report. If no adverse effects were noticed at the site after 38 years, probably not much is going to come from it. Make the deletions demanded by Howe and get on with your career ( 7%).

**A2**: You decide to comply with Charlie Howe's demands, and after making the requested deletions, sign the report and have it sent to Americorp. You also keep in your personal files at home all the uncovered information, whether documented or not, the original draft report, the returned draft modified by the Dewey firm, and a record of your discussions with your manager and with Charlie Howe (10%).

**A3**: You like to eat, and finding another job is not all that easy, especially if the word got out that you might be a "problem employee". Therefore you decide to comply with Charlie Howe's demands, but in the report you document your research sources for the "preliminary review based on available documented information", leaving out the hearsay opinion of the old gentlemen at the lunch counter (3%).

**A4**: Make the changes demanded by Howe. Include a statement in the executive summary at the beginning of the final report that says, "The information contained herein is the result of an investigation performed under direct contract with Americorp, in accordance with the limited scope of work defined in that contract. This information is for the exclusive use of Americorp and no one else may rely on it." In this way you are not certifying anything one way or the other to the lending institution (17%).

**A5**: Edit the draft report as Charlie Howe wishes, sign and send the final report to Americorp with a copy to Howe. Also in the transmittal letter to Howe report the hearsay comments from the lunch counter and recommend that you be retained to investigate further to see if there might be any real basis to the allegation. Pass this by your manager for his verbal approval. If he doesn't approve, then keep your own notes of what you were directed to do in your personal files at home (20%).

**A6:** Tell your manager you are uncomfortable issuing such a potentially misleading report, but will make the required deletions and issue the report immediately. After making the report revisions, you have it delivered to your manager with a note saying, "I've made all the changes you asked me to. Please review and sign the report and I'll make sure it gets to Americorp this afternoon (7%).

**A7**: Tell your manager you are uncomfortable issuing such a potentially misleading report, but will make the required deletions and issue the report immediately. You make the requested changes and sign the report. But before you have it delivered to Americorp, you have one of the senior engineers in your group sit in (via speaker phone) on a call to Charlie Howe in which you tell Charlie that, although you still have reservations regarding the requested deletions as you discussed with him this morning, your manager has reviewed your concerns and OK'd the revisions. You will have the revised report delivered to Americorp with a copy to Charlie, today (8%).

**A8:** This type of thing happens all the time. In this case even though no construction is planned for the site, (so none of the residue from the alleged old creosoting plant will be exposed), you are not being truthful in your report. The bank putting up the refinancing loan may be liable if anything adverse does occur in the future, and they will then surely come looking for you. Tell Howe and you manager that you are issuing the report as it was originally written, without making the deletions (14%).

**A9:** This type of thing happens all the time. You are hired by a company to do an investigation, then end up taking marching orders from an attorney with whom you have no contractual agreement and whose primary goal is to insulate their client from any and all potential financial losses. It doesn't seem to matter if what they tell you to do is ethical or not. Refuse to do as Charlie Howe demands, and tell your manager that your integrity is not for sale (9%).

**A10:** This type of thing happens all the time, and it's about time someone took a definitive stand to stop it. Tell Charlie Howe and your manager that what they want you to do is not honest, and you will not do it. Also tell your manager that you will spill the whole sordid story to the local newspaper if you experience any adverse reaction at work from your decision (5%).

Then, we will do the Kepner Trego Decision Analysis (KTSA) by evaluating these alternatives with the must and wants that's we have made according to the case as shown in the table 1.2 and 1.3 respectively. Notice that table 1.1 illustrates the decision statement.

**Table 1.1 The Decision statement**

**Decision statement:**Nominate the alternative that match our criteria using the   
constraints and desires.

**Table 1.2 Musts**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Alternatives** | | | | | |  |  |  |  |
| Musts | A1 | A 2 | A 3 | A 4 | A 5 | A 6 | A 7 | A 8 | A 9 | A 10 |
| 1.  Do not break the ethics | GO | GO | NO GO | GO | GO | GO | GO | GO | GO | GO |
| 2.  Follow the engineering role and system | GO | Maybe | GO | GO | GO | NO GO | NO GO | GO | GO | GO |
| 3.  Give a reliable information | GO | GO | Maybe | GO | GO | GO | GO | GO | GO | GO |
| 4. Do not include a rough transaction | GO | GO | GO | GO | GO | GO | GO | GO | NO GO | NO GO |
| 5. Have steps that save your rights when a problem occurs | NO GO | GO | GO | GO | GO | GO | GO | GO | GO | GO |
| 6.  Do not affect my professional reputation | GO | NO GO | NO GO | GO | GO | NO GO | GO | GO | GO | NO GO |

**Table 1.3 Final wants**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A 4** | | **A 5** | | **A 8** | | |
| **Wants** | **Weight** | **Rating** | **Score** | **Rating** | **Score** | **Rating** | | **Score** |
| 1.  Provide a sense of integrity | 9 | 6 | 54 | 9 | 81 | 10 | | 90 |
| 2.  Have less damage to company | 6 | 9 | 54 | 8 | 48 | 2 | | 12 |
| 3. Have less bad impacts on citizens | 8 | 4 | 32 | 6 | 48 | 10 | | 80 |
| 4. Make Howe thinks about taking the test seriously | 4 | 2 | 8 | 9 | 36 | 6 | | 24 |
| 5.  Combine the benefits of all sides with low consequences | 3 | 3 | 9 | 10 | 30 | 3 | | 9 |
| 6.  Have less responsibility on the engineer | 10 | 10 | 100 | 10 | 100 | 8 | | 80 |
|  |  | Total A 4 = 257 | | Total A 5 = 343 | | | Total A 8 = 295 | |

Now, we can move to the next step which is to do an adverse consequences table for the three ideas 4, 5 and 8 as shown in table 1.4, 1.5 and 1.6 respectively.

**Table 1.4 Adverse consequences for A 4**

|  |  |  |  |
| --- | --- | --- | --- |
| **Adverse consequences for A 4** | **Probability (P)** | **Severity**  **(S)** | **Threats**  **(T)** |
| 1. The creosoting plant will affect the citizens | 8 | 10 | 80 |
| 2. Not accepting the report | 3 | 8 | 24 |
| 3. Force citizens to hate you | 6 | 5 | 30 |
|  |  |  | **Total =** 134 |

**Table 1.5 Adverse consequences for A 5**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Adverse consequences for A 5** | **Probability (P)** | **Severity**  **(S)** | **Threats**  **(T)** | |
| 1. Howe doesn't take your recommendation seriously | 3 | 5 | 15 | |
| 2. Miss the notes | 1 | 8 | 8 | |
| 3. Lose the loan from the bank | 3 | 10 | 30 | |
|  |  |  | **Total = 53** |  | |

**Table 1.6 Adverse consequences for A 8**

|  |  |  |  |
| --- | --- | --- | --- |
| **Adverse consequences for A 8** | **Probability (P)** | **Severity**  **(S)** | **Threats**  **(T)** |
| 1. The creosoting plant moves by rain and exposes to the citizens | 6 | 10 | 60 |
| 2. Lose the corporation with Americorp | 9 | 7 | 63 |
| 3. The Loan from the bank will stop and increase in interest rate | 8 | 9 | 72 |
|  |  |  | **Total =**195 |

# Our Alternative

We have chosen the fifth alternative which is to edit the draft report as Charlie Howe wishes, sign, and send the final report to Americorp with a copy to Howe. Also in the transmittal letter to Howe report the hearsay comments from the lunch counter and recommend that you be retained to investigate further to see if there might be any real basis to the allegation. Pass this by your manager for his verbal approval. If he doesn't approve, then keep your own notes of what you were directed to do in your personal files at home.

We have chosen it since it has the highest rate of integrity with taking consider the benefit of the company and not relaying much responsibility on the engineer. Also, it advised Howe to do more tests for the place.

# Discussion

To conclude this, we’ve learned how to make a decision taking into account our principles and the ethics to make it professionally. We did that firstly by placing the musts and the wants we’ve collected for this assignment and by using multiple techniques such as KTDA and adverse consequences. We’ve reached our final solution which will be the 5th solution and the reason has been mentioned above. After this in the future before any big changes, we will take care of the ethics that will make our reputation the best, professionally and morally.

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***KING ABDULAZIZ UNIVERSITY***

***FACULITY OF ENGINEERING***

***Subject: IE 201 (52405) (11)***

***Instructor: Eng. Khalid Aljohani***

***9. Reverse Engineering***

**Team 4**

**Saad Alhassan**

**Suliman Alahmadi**

**Bader Algamdi**

**Abduallah Babder**

**Osamah Alfifi**

**Team: 4**

**Device: Our project**

**1-Goals for reverse engineering of assigned device (Problem definition?)**

We thought of using some parts on a ball throwing machine, so we needed to figure how these parts actually work

---------------------------------------------------------------------------------------------------------------------------

**2-Plan for reverse engineering of device.  Include plans for any proposed disassembly. (Implementation?)**

First start with studying parts of the device and discover how it has been connected, then start dissembling the device part by part to know which parts can the reverse engineering be implemented on

---------------------------------------------------------------------------------------------------------------------------

**3-Part(s) chosen for reverse engineering analysis**: IR sensor, Relay, Electric locker, spring.

-----------------------------------------------------------------------------------------------------------------

**4-The function of the part(s) in the device:**

IR sensor: used to read the bodies from 10cm to 25 cm. it uses the infrared to detect the reflected bodies in the assigned distance.

Relay: is used to separate the circuits and turn them on with less signal, like a switch.

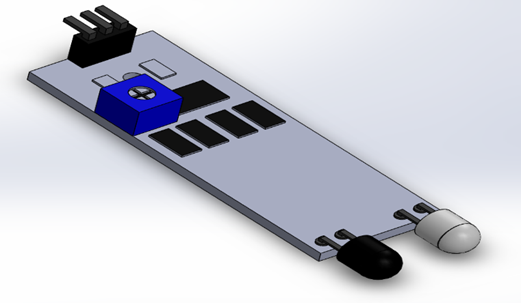
Electric locker: used to control the buttons and to open/close the circuit.

Spring: can be used to push or boost objects.

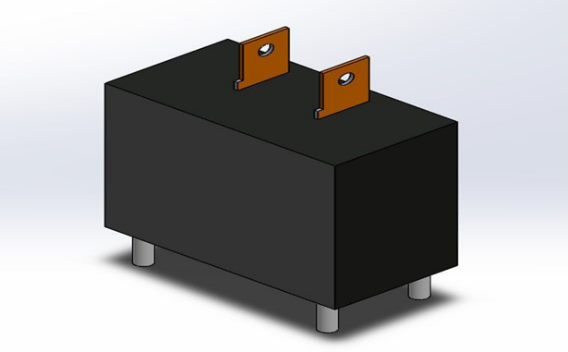
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**5-Describe the part(s) (you may, if you wish, attach sketches to the back of this sheet) - material(s), shape, size color, hardness, thickness, etc.**

1-IR sensor has an almost rectangular shape with size of 4x1 cm and a blue and silver colors. IR sensors are not solid, and they are slim

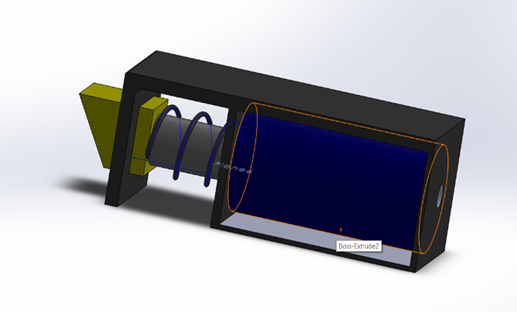
  
Pictures 1: IR sensor

2-Relays are like a 3D rectangular shape with 4.5x3 cm and a blue color. Relays are almost solid and thick.



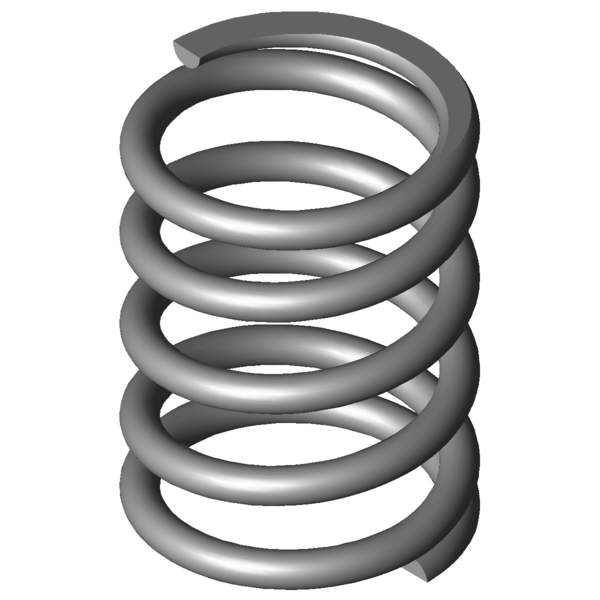
Pictures 2: Relay

3-Electric locker has its cylindrical shape with 5x2 cm and blue, silver and gold colors. Electric lockers are solid and thick.



Picture3: Electric locker

4-A spring has a circular bouncy shape with 6x1.25 cm and a silver color. They are also solid but not thick.



Picture 4: Spring

**-----------------------------------------------------------------------------------------------------------------**

**6-WHY does the part(s) have these properties?  What potential problems were solved by designing the part(s) to have these properties?**

IR sensor can detect bodies which we can make benefit from it a lot of projects. It solved the problem which was that the project cannot be activated because there's nothing can read the outer environment.

Relay: relays can be in charge of connecting parts to electric circuits and be used as a switch, it can organize the electric parts that has been connected. It has made the circuits easier and more efficient for us.

Electric locker: As they are called, electric lockers can be used as a lock. It can be used on timing parts to be activated when needed

Spring: the most useful thing we could benefit from a spring is to push things away. Which will help us to push objects.

---------------------------------------------------------------------------------------------------------------------------

**7-Write down whatever you know or can deduce about how the part(s) are manufactured.**

صورة تحتوي على نص, إلكترونيات

تم إنشاء الوصف تلقائياً  
  
IR sensor

صورة تحتوي على نص, إلكترونيات

تم إنشاء الوصف تلقائياً

Relay

Electric lockers: spring, two wires, metal body, copper wire, metal head.

Spring: circular bouncy piece of metal

-----------------------------------------------------------------------------------------------------------------

**8-Write down how you would re-engineer the device, the part(s), and/or the manufacturing processes to (a) reduce the part count, or (b) make the device/the parts:  better,  faster, cheaper, stronger, easier to use**

We will use the IR sensor to detect if the ball thrower machine has any balls inside it which will activate the relay attached to the electric locker. Then the spring will do its job by pushing the balls away. (a) we will only one spring, one electric locker, one IR sensor and 2 relays. (b) we will need a bigger and stronger spring, bigger electric lock with the same IR sensor and relays which will make the project easier and cheaper to implement.

-----------------------------------------------------------------------------------------------------------------

**9-Why are the changes suggested above not part of the device?**

Because we use at least 3 spring and an electric locker for each spring. We are also satisfied with the size and power of our springs and electric lockers. Also, it will be expensive to implement

**10-List at least five of the problem-solving tools/heuristics/skills/approaches that you used in the course of this exercise.  Describe why you chose them and how you used them.**

1-We used brainstorming to generate a new idea using the parts of our project, which to generate as much possible idea as we can in order to have a variety of ideas. We used these ideas to select the best of them so that we can have a high-quality project.

2- How to solve the assembly problems. It is a skill that emphasize on the mechanical techniques. We used it by taking advantage of it, so we can reach a well-designed product.

3. Creativity, which is to deep and think out of box in order to have a revolutionary idea. We used this skill when we combined our project to abbreviate pieces and increase the performance of the project.

4. Not hooking by the first idea that come up. These approaches mean to not being much interested in the first idea. We used these approaches to not blocking the generation process.

5-We used one of the Five P’s which is Patience, because We had to be patient to complete this work and not be rushed or bored. This trait is considered one of the most important qualities that an engineer must learn.

# Index

1. Norms: A certain number of rules that must be followed by the people who signed it.
2. Process Check: An assignment of IE201 that focuses on the team and its road to accomplish tasks and orders.
3. Conflict: Disagreement or problems that occur between two people or more.
4. Questionnaire: A list of questions that established for certain reasons, the more answers you get the accurate results you get.
5. Trigger: Feature or character
6. Dunker Diagram: A shape or drawing that define a problem by three sides: the present, ok state, and desired state
7. Random stimulation: One of the vertical thinking methods, that serves to exit your mind from a circle of ideas to another by thinking of word that leads you to another until you reach the aimed idea, or something help to.
8. SCAMPER technique: A technique that used to generate number of ideas from one idea, it consists of six triggers substitute, combine, adapt, magnify, put to another use, eliminate and rearrange
9. Kepner Tregoe: A methodology that serves to define and solve the problem then, ensure its success.
10. Adverse consequences: The upcoming problems or difficulties.
11. Gantt Chart: A table that illustrates the distribution of the task between number of people in certain range of period.
12. Priority: The trend of something based on special criteria.
13. Cruise Control: Machine that make the speed of the car at a constant value.
14. Equalizer: A filter for audio inside the car that enhance the quality of the sounds.
15. Situation Analysis: An analytical study for the present state, what are the order of the tasks, its timing and impact on the person or company.
16. Malfunction: None working or damaged.
17. Reckless driving: Means to not follow the safety and rules while driving the car.
18. Nano-ceramic: A thin layer that coat something to make it resistant to bacteria or other things.
19. Sensor: A devise that read something like distance wight etc. Then, turn it to an electrical signal.
20. Transmittal letter: It is as cover page for businesses letters. It explains why the material are important and describe its relationship.
21. Local lending institution: A governmental or private entity that lend a money.
22. Creosoting plant: A plant that's called Larrea tridentata. It's a flowering planet that used in medicine.
23. Unsubstantiated gossip: A type of speech that has no value and should not be considered.
24. Reverse engineering: A process that aims to understand the mechanism of something from it is tiny parts to the large picture in order to enhance it.
25. Heuristics: An approach to study something or to reach something.

# References

1. King Abdulaziz University. IE201 Website. Lab session  
   Available at: < <https://sites.google.com/site/kauie201/concept> >  
    [Accessed 9 December 2021].
2. King Abdulaziz University. IE201 Team Four's Website  
   Available at: < <https://2u.pw/AY1QZ> >  
    [Accessed 9 December 2021].