This question paper consists

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LUBS5308M

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**(Semester 1, 2023/2024)**

**Assessed Coursework**

**LUBS5308M Business Analytics and Decision Science**

**100% Assignment**

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| This assignment contains two parts which are both equally weighted. You must complete both part 1 and part 2:  **Part 1 AutonomousShipment roll-out: autonomous delivery trial (50% marks - 1,500 words maximum):**  **Background information**  In this part of the assignment, you are the analytic manager of “AutonomousShipment”, a new start-up venture operating out of Leeds that is looking to use autonomous robot drones to conduct last leg logistics to deliver different products to customer doorsteps. The belief is that consumers would benefit from faster delivery through automation and that the company will benefit from optimisation and reduced costs. This new venture is supported by several venture capital investors and backed by the UK government.  To do this, the management team which you directly report to are planning to conduct a trial roll out in the area around Leeds, working with various different stores such as groceries, clothing, sport, and tech stores. The company has developed four prototype robots which they are considering and would like to trial one of these robots. The management would like the trial to run for a month and to ensure that the trial covers as many potential customers across the different store types as possible. The priority, however, is that the trial remains on budget.  Given robots are set to roll-out on the streets of Leeds, this requires management of AutonomousShipment to make two decisions:   1. They must decide on a prototype robot that would participate in this trial based on a set of requirements. 2. They must decide how many robots to allocate across various stores to ensure that the goal and constraints of the trial are satisfied.   The management have tasked you to provide a report to them that addresses both questions. You should use tables and figures as appropriate as well as text to present your findings. The report should be in a format that is suitable for this purpose of communication to the management team.  **Your Task**  1st Task  Firstly, you must provide a recommendation that is based on maximising utility in accordance with the requirement that is set by the decision-maker on which prototype robot should be used for this trial. Overall, the company has identified four potential prototypes that they have developed:   * Robot A032 - Archer * Robot B23 - Bowler * Robot CJKL - Corner * Robot DSXX – Deviant   There are several concerns that impact such a decision both qualitatively and quantitatively. The decision on which prototype to use should be based on the following criteria:.   * Carrying Capacity – The carrying capacity in litres of each autonomous robot. The company prefers to have a larger robot as some products may be large. * Battery Size – The battery capacity in hours of operation for each autonomous delivery robot. The company prefers to have a robot with a larger battery as this would result in less need to recharge and a greater coverage distance. * Average Speed – Average speed in km/h for each robot. The company would prefer the robot that has a higher average speed. * Cost per Unit – Cost per unit of each robot in GBP. The company would prefer the robot that has the lower cost per unit. * Reliability – Estimate average time between instance of breakdown. The unit is in hours of operation till breakdown. The company would prefer a robot that has a higher reliability and a smaller number of breakdowns. * the autonomous system is not part of the evaluation, the focus of selection is on hardware, not software.   The information about each robot in relation to these criteria are available in the file ‘Robot\_Info.csv’ and the importance that is put into each of them by the management team is provided in the file ‘Management\_Priority.xlsx’. The importance of each criterion was derived from latest management team meeting in July 2023.  2nd Task  The trial is for a limited time and for a limited budget. You have a goal that is less focused on the profit, but ensures that the test covers key objectives that would improve your understanding for the future implementation of autonomous robot. As such, you must allocate these autonomous robots across various different stores so that the store can use them for delivery to a local customer. The options include:   * Grocery Store * Clothing Store * Sport Equipment Store   You have a limited budget for the trial and the total cost must not exceed the trial budget of 250,000 GBP in any circumstances. The individual cost of each robot is based on the robot that is selected for the first task plus operating costs.  The following information about each store is provided below:   1. Estimated number of orders that each robot should be able to deliver per day:    1. Grocery Store: 9 orders per robot per day    2. Clothing Store: 6 orders per robot per day    3. Sport Equipment Store: 4 orders per robot per day 2. Operating cost per a single robot per store (this is in addition to the cost of the robot selected from 1st task.)    1. Grocery Store: 1600 GBP per robot per month    2. Clothing Store: 1000 GBP per robot per month    3. Sport Equipment Store: 600 GBP per robot per month 3. The number of technician staff working hours needed per robot per week to support each store, each store has different procedures for packing the product so this would be different. (there is no additional cost associate with this)    1. Grocery Store: 10 technician man hours per robot per week    2. Clothing Store: 7 technician man hours per robot per week    3. Sport Equipment Store: 5 technician man hours per robot per week   The constraint and goals of the trial is as follows:   1. Each store must have at least 5 robots during the trial. 2. The trial should have robots complete as many orders as possible per day. 3. The total number of technician staff hours available to support this trial is 250 hours per week. 4. The cost of operation and acquisition must not be more than the budget.   You must provide a solution of how to conduct a trial that adheres to above requirements.  **Submission Guidelines**  You can use any MCDA technique that you deem to be appropriate to make the recommendation to both questions. Your report should include your recommendations for both decisions above. Your (1,500 word maximum) report should use tables and figures as appropriate as well as text to present your findings. Your report should justify why your approach is the optimal and logical solution in an understandable way. The report should be in the format that is suitable for this purpose of communication to the management team. The report should be within the word count specified.  You may however submit an appendix showing your calculations and your code, which will not be included in the word count. This will not form part of marking.  The marks for the assignment are awarded on the basis of the main text only. You can use any analytics tool to conduct the data processing and analytics work.  **Marking Scheme**   |  |  | | --- | --- | | **Success Criteria** | **Weighting** | | **General**  Overall Presentation  Use of tables and graphics    **Introduction to the business problem**    **Task 1**  Demonstrate understanding of the task, the data and how it need to be processed for the task.  Describe the choice of MCDA method that is used and how it can satisfy the task that was set out.  Provide recommendation in accordance with the requirement of task 1. Demonstrate the solution as optimal and logical.    **Task 2**  Demonstrate understanding of the task, the data and how it need to be processed for the task.  Describe the choice of MCDA method that is used and how it can satisfy the task that was set out.  Provide recommendation in accordance with the requirement of task 1. Demonstrate the solution as optimal and logical.    **Summary of response to management of the company** | **10%**  5%  5%  **10%**  **35%**  10%  10%  15%  **35%**  10%  10%  15%  **10%**  **Total = 100%** |   **Note:** Presentation includes structure/format of the report, clarity of expression, grammar and spelling. Your report will be rated on each success criterion using a six-point scale from 0 (very poor) to 5 (excellent). The overall mark will be a weighted average of the ratings.  **Part 2: Value of customers: what makes a customer valuable? (50% marks - 1,500 words maximum):**  **Background information**  ‘Drinks@home.uk’ is an ecommerce website which operate a direct to consumer business. It operates within the area of Great Britain and deal withs both alcoholic and non-alcoholic beverages from all over the world. In this assignment, you work for ‘drinks@home.uk’ as an analyst. You have been provided with the data on 400 customers. Information that is provided include the revenue from the order that they made, the advertisement medium that brought them to the website, their age, their income, the time that they have spent on the website on average over a week, and if they have been presented with an online voucher pop-up in the past.  Your manager would like to gain a better understanding of your customers so that he can prepare a report to input to the next marketing campaign. Therefore, he has tasked you to write a report for him answering two business questions:   1. Given the demographic and behaviour of past customers on the website, what is the factor that has significantly lead to customers spending more or less money on the ‘drinks@home’ website. 2. There are three choices on the next marketing project and your manager would like to get your recommendation on which one would be the best to go with for increasing profits.   **Your Task**  1st Task  The first task is for you to determine what is the factor that positively or negatively impacts the spending of each customer on the website. You have been provided with the following information on 400 customers of the website.   * Revenue (GBP) – This is the revenue from the latest order that was made by this customer. * Advertisement Channel – This is the advertisement medium that brought them to the website which includes: {1: Leaflet,2: SocialMedia, 3: SearchEngine, 4: Influencer} * Estimated Age – This is an estimated age of the customer according to the website tracking software. * Estimated Income (GBP) - Customer estimated income according to website tracking software. * Time on website per week (Seconds) – The estimate average time that the customer spends on the website per week. * Seen Voucher – If the customer has seen any discount voucher popup.   The information about each customer is available in the file ‘Transactions\_Customer.csv’. You should provide a report to the analytics manager on which factors have a positive and negative influence on revenue generated on the website. You should provide justification and a detailed explanation of how you logically come to this conclusion in regard to factors that influence each customer.  2nd Task  Given what is learnt in the first task, ‘drinks@home.uk’ would like you to present them with a recommendation between three options that they are considering to increase profit on the website:   1. Run an advertisement targeting customers who are older than 45 years old as they are likely to spend more money. 2. Provide a voucher for 20 GBP off their next orders. 3. Spend more money on advertising with an influencer.   This recommendation should be based on findings from task 1 and you should provide justification and a detailed explanation of how you logically came to this conclusion in regard to factors that influence each customer.  **Submission Guidelines**  You can use any business analytic model that you deem to be appropriate to answer both questions. Your report should include your answer for both decisions above. Your (1,500 word maximum) report should use tables and figures as appropriate as well as text to present your findings. Your report should justify why your approach is the appropriate solution in an understandable way.  The report should be in the format that is suitable for this purpose of communication to the management team. The report should be within the word counts specified. You may submit as an appendix output in support of material in the analyses, which will not be included in the word count. However, no appendices are required, and any material provided in appendices will not contribute to the final mark. The marks for the assignment are awarded on the basis of the main text only. You can use any analytics tool to conduct the data processing and analytics work.  **Marking Scheme**   |  |  | | --- | --- | | **Success Criteria** | **Weighting** | | **Business Understanding**  This is to set the context of this report by describing the business context and the background of the task.  **Data Understanding**  Demonstrate an understanding of the data in relation to the business question, e.g. distributions, visualisations of the data, etc.  **Data Preparation**  Appropriately pre-process the raw data for the modelling of choice in relation to the business questions.  **Modelling**  Select and correctly apply an appropriate model for the business task.  **Evaluation**  Demonstrate, in relation to the business question, how to evaluate and identify an answer from the model and how to demonstrate if the model is good or bad.  **Conclusion/Deployment**  Providing a clear and concise answer to the business questions | **10%**  **10%**  **20%**  **25%**  **25%**  **10%**  **Total = 100%** | |

**Assignments should be a maximum of 3000 words in length.**

All coursework assignments that contribute to the assessment of a module are subject to a word limit, as specified on the assessment brief. **The word limit is an extremely important aspect of good academic practice, and must be adhered to.** Unless stated otherwise in the relevant module handbook (if one has been provided), the word count includes EVERYTHING (i.e. all text in the main body of the assignment including summaries, subtitles, contents pages, tables, supportive material whether in footnotes or in-text references) except the main title, reference list and/or bibliography and any appendices. It is not acceptable to present matters of substance, which should be included in the main body of the text, in the appendices (“appendix abuse”). It is not acceptable to attempt to hide words in graphs and diagrams; only text which is strictly necessary should be included in graphs and diagrams.

You are required to adhere to the word limit specified and state an accurate word count on the cover page of your assignment brief. Your declared word count must be accurate, and should not mislead. Making a fraudulent statement concerning the work submitted for assessment could be considered academic malpractice and investigated as such. If the amount of work submitted is higher than that specified by the word limit or that declared on your word count, this may be reflected in the mark awarded and noted through individual feedback given to you.

**The deadline date for this assignment is 12:00:00 noon on 3rd of January 2024**

An electronic copy of the assignment must be submitted to the Assignment Submission area within the module resource on the Blackboard MINERVA website no later than 12:00:00 noon prompt on the deadline date.

Faxed, emailed or hard copies of the assignment will not be accepted.

Failure to meet this initial deadline will result in a reduction of marks, details of which can be found at the following place:

<https://students.business.leeds.ac.uk/assessment/code-of-practice-on-assessment/>

**SUBMISSION**

Please ensure that you leave sufficient time to complete the online submission process, as upload times can vary. Accessing the submission link before the deadline does **NOT** constitute completion of submission.You **MUST** click the ‘**CONFIRM**’ button before 12:00:00 noon for your assignment to be classed as submitted on time, if not you will need to submit to the Late Area and your assignment will be marked as late. It is your responsibility to ensure you upload the correct file to the MINERVA, and that it has uploaded successfully.

**It is important that any file submitted follows the conventions stated below**:

**FILE NAME**

The name of the file that you upload must be your student ID only.

**ASSIGNMENT TITLE**

During the submission process the system will ask you to enter the title of your submission. This should also be your student ID only.

**FRONT COVER**

The first page of your assignment should always be the Assessed Coursework Coversheet (individual), which is available to download from the following location:

<https://students.business.leeds.ac.uk/forms-guidance-and-coversheets/>

**STUDENT NAME**

You should **NOT** include your name anywhere on your assignment

**END**