

# Pearson

**Higher Nationals in**

**Computing**

Unit:

12 Data Analytics

For use with the Higher National Certificate and Higher National Diploma in Computing

Assignment Brief Number: 2

**Higher National Certificate/Diploma in Business**

### Assignment Brief

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| Student Name /ID Number | CELIS VASQUEZ SONIA PATRICIA |
| **Unit Number and Title** | **12: Data Analytics** |
| Academic Year | 2020 |
| Unit Tutor | Daniel González Martínez |
| **Assignment Title** | **Data Analytics: Prescriptive Analytics** |
| Issue Date | **February 2nd, 2020** |
| Submission Date | March 27th, 2020 |
| IV Name & Date | Luis Ortiz |



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| **Submission Format:** |
| You must record every step you have taken to implement the solution to those questions in the workbook. Also, discuss how you overcame the issues and constraints you have faced during the implementation process. |

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| **Unit Learning Outcomes:** |
| **L04** Demostrate prescriptive analytic methods for finding the best course of action for a situation |
| **Assignment Brief and Guidance:** |
| 1. Define, briefly, the following prescriptive analytic methods and indicate two examples of analytic techniques for each of them:    1. Optimization    2. Decision analysis        1. Open the given Excel file (prescriptive\_overbooking.xlsx). The airline company Avio noticed that in each flight there are several no-shows (passengers that had bought a ticket but didn’t fly) and your boss wants to sell more tickets than the total number of seats to optimize revenues. You are asked to identify the number of extra tickets the company should sell to maximize revenues. All the variables and formulas are given in the Excel file. Use the Solver Add-in to maximize Total Revenues changing the variable Overbooking Tickets.  * What is the number of Overbooking Tickets that maximizes revenues?              1. In the previous assignment you used a multiple linear regression to identify the impact of Avio’s prices and competitors’ prices on flight demand. You finally identified the regression function to estimate flight demand. Describe how you could use this function to create an optimization model:  * What would be the objective of the optimization? * What is the decision variable? * Can you imagine any constrain concerning the Pax (demand) variable?      1. The CEO of Avio looked at satisfaction data in different months and claims that average satisfaction is significantly different in summer compared to winter. To verify his statement you take a sample of 30 clients who have travelled both in summer and in winter (in the following table). At 5% level of significance, test to see if the evidence supports the CEO’s theory.  |  |  |  | | --- | --- | --- | | Person | Satisfaction summer | Satisfaction winter | | 1 | 7 | 9 | | 2 | 4 | 6 | | 3 | 9 | 2 | | 4 | 2 | 3 | | 5 | 9 | 1 | | 6 | 6 | 7 | | 7 | 9 | 5 | | 8 | 1 | 2 | | 9 | 4 | 8 | | 10 | 1 | 5 | | 11 | 3 | 6 | | 12 | 10 | 4 | | 13 | 5 | 1 | | 14 | 9 | 9 | | 15 | 1 | 5 | | 16 | 10 | 9 | | 17 | 5 | 6 | | 18 | 9 | 2 | | 19 | 8 | 4 | | 20 | 9 | 1 | | 21 | 6 | 7 | | 22 | 10 | 5 | | 23 | 1 | 2 | | 24 | 9 | 8 | | 25 | 2 | 5 | | 26 | 3 | 6 | | 27 | 10 | 4 | | 28 | 5 | 5 | | 29 | 4 | 8 | | 30 | 1 | 4 |       State the hypothesis in words, and perform a t-test to test whether the evidence supports the physician’s theory, at the α = 5%. (Use a programming language or a data analytic tool.)   * Perform the parametric t-test. * State the hypothesis: null hypothesis and alternative hypothesis. * Report normality test result using p-value.  1. The value of the test statistic is = 2. Write the conclusion using p-value. 3. Also comment on whether the evidence is statistically significant enough to support the physician’s claim.  * Perform the nonparametric signed rank test.  1. Value of the test statistic is = 2. Conclusion with p-value.  * Also comment on whether the evidence is statistically significant enough to support the CEO’s claim.                      1. Avio has been asked to give a quote for a group. You can either offer a full fare price of 500€ or a discount fare price of 350€. Based on past experience the probability of the full fare price to be accepted is 65%. Instead, if you offer the discount fare price you are almost certain they will buy the tickets (100% probability).    1. Open the given Excel file (prescriptive\_group.xlsx), fill the decision tree template with the given figures, and make the necessary calculations.    2. Should the company offer the discount or full fare price?    3. What if the probability of selling the full fare ticket is 70%? |

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| **Learning Outcomes and Assessment Criteria** | | |
| **Pass** | **Merit** | **Distinction** |
| **P7** Analyse prescriptive analytic techniques with appropriate examples. | **M4** Describe how these prescriptive analytic techniques are used to find the best course of action in a situation. | **D3** Apply an appropriate programming language or tool to demonstrate how these prescriptive analytic techniques are used to find the best course of action in a situation. |
| **P8** Demonstrate these techniques using an appropriate programming language or tool. |

**Plagiarism**

Plagiarism is a particular form of cheating. Plagiarism must be avoided at all costs and students who break the rules, however innocently, may be penalised. It is your responsibility to ensure that you understand correct referencing practices. As a university level student, you are expected to use appropriate references throughout and keep carefully detailed notes of all your sources of materials for material you have used in your work, including any material downloaded from the Internet. Please consult the relevant unit lecturer or your course tutor if you need any further advice.

**Student Declaration**

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| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.  Student signature: Date: |