Submission Format
Written Report: A **case study** showing evidence of tools and technologies associated with data science, drawing conclusions on techniques to make recommendations that support real-world business problems. The recommended word limit is 2,500- 4000 for the case study, although you will not be penalized for going under or exceeding the total word limit.

Unit Learning Outcomes

LO1 Discuss the use of data and information to support business processes and the value they have for an identified organization.

LO2 Discuss the implications of the use of data and information to support business processes in a real-world scenario.

LO3 Explore the tools and technologies associated with data science and how it supports business processes.

LO4 Demonstrate the use of data science techniques to make recommendations to support real-world business problems.

Transferable skills and competences developed

Computing-related cognitive skills

- Demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to computing and computer applications
- Recognise and analyse criteria and specifications appropriate to specific problems, and plan strategies for their solutions.
- Methods and tools: deploy appropriate theory, practices and tools for the design, implementation and evaluation of computer-based systems.
- Recognise the professional, economic, social, environmental, moral and ethical issues involved in the sustainable exploitation of computer technology and be guided by the adoption of appropriate professional, ethical and legal practices.

Computing-related practical skills

- The ability to evaluate systems in terms of quality attributes and possible trade-offs presented within the given problem
- The ability to critically evaluate and analyse complex problems, including those with incomplete information, and devise appropriate solutions, within the constraints of a budget.

Generic skills for employability

- Intellectual skills: critical thinking; making a case; numeracy and literacy
- Contextual awareness, e.g. the ability to understand and meet the needs of individuals, business and the community, and to understand how workplaces and organisations are governed.

Vocational scenario

Organisation

Destination Data is a consultancy firm headquartered in London, working with clients who make use of open data sources from local/national government agencies for supporting business processes and real-world business problems in terms of optimising decision making and performance. Local/national government agencies around the world are investing heavily to make public sector data open access and information they hold available, ensuring that stakeholders can make use of data how they see fit, and improve communication of data analysis through visualisation. The increased use of data and information is visible in a wide range of areas in the community, including economy, transport, environment, housing, safety, health, and education. Advantage of public datastores is limitless, with large volumes of authentic information for extracting insight an essential resource in the modern world.

Role

You are employed by Destination Data as an intern and have worked on several projects over the last three months connecting clients with local/national datastores. You have been asked by the Head of Client Services to prepare a report, with an accompanying summary sheet, to show future clients how they can use data and information to support business processes for informing best practice. If successful, your line manager has agreed to let you lead the next project and solution design.

Assignment activity and guidance

Activity1:

A new client, Enviro Wise (**Student can choose another company**), is looking to explore solutions driven by data for improving the environment. While not an exhaustive list, they want to solve real-world business problems and improve the way local/national communities conserve endangered species, reduce energy consumption, assist water conservation, optimise waste management, find sustainable food sources and increase the use of renewable resources.

You were recently promoted full-time by Destination Data to Junior Analyst. Part of your role is to support the new intake of interns in understanding the business, particularly client consultation and the solution support offered by the firm.

Your line manager has asked for you to contribute to a case study that looks at appropriate tools and technologies for designing data science solutions to support Enviro Wise. You should demonstrate the use of data science techniques, making recommendations that support decision making for a real-world business problem. The case study should show implementation of a data science solution and be evaluative in nature. This involves a detailed investigation of a topic and aims to bring understanding of a complex issue or real-world problem in a given context, so bear this in mind when devising the case study. Your examples should be based on Enviro Wise's

business case, and relevant datasets sourced/imported from one or more free open public datastores. You can decide on the format of your case study, but it must be professional in content and design, giving specific examples throughout.

As part of the **case study**, you are expected to:

● provide a discussion of how data science associated tools and technologies, support business processes and inform decision making

● present your design of a data science solution to support decision making in relation to real-world problem faced by Enviro Wise, assessing the benefits of using data to solve problems in practice

● summarise implementation of a data science solution with Enviro Wise, making clear how design performed a specific task to support problem solving or decision making

● justify recommendations that support decision making in reference to your real-world problem and conclude your case study with an evaluation on the use of data science techniques, addressing how these met Enviro Wise's user and business requirements.

Recommended resources

Please note that the resources listed are examples for you to use as a starting point in your research – the list is not definitive

Weblinks:

https://builtin.com/ (2022) What Is Data Science? A Complete Guide [online] Available at: https://builtin.com/data-science [Accessed 1 August 2022] https://datascience.codata.org/ (2022) Data science -Online data science journal [online] Available at: https://datascience.codata.org/ [Accessed 1 August 2022] https://towardsdatascience.com/ (2022) Data Science Articles [online] Available at: https://towardsdatascience.com/ [Accessed 1 August 2022] https://www.simplilearn.com/ (2022) What is Data Science: Lifecycle, Applications, Prerequisites and Tools [online] Available at: https://www.simplilearn.com/tutorials/data-sciencetutorial/what-is-data-science [Accessed 1 August 2022]

Weblinks - open data stores & portals:

https://data.gov.au/ (2022) Australian Government Datastore [online] Available at: https://data.gov.au/ [Accessed 1 August 2022]

https://data.gov.sg/ Singaporean Government Datastore [online] Available at: https://data.gov.sg/ [Accessed 1 August 2022] https://data.london.gov.uk/ London Datastore [online] Available at: https://data.london.gov.uk/ [Accessed 1 August 2022] https://daten.berlin.de/ Berlin Open Data [online] Available at: https://daten.berlin.de/ [Accessed 1 August 2022]

https://opendata.cityofnewyork.us/ Open Data for All New Yorkers [online] Available at: https://opendata.cityofnewyork.us/ [Accessed 1 August 2022]

Journal articles:

Gupta, A., Panagiotopoulos, P. and Bowen, F. (2020) An orchestration approach to smart city data ecosystems. Technological Forecasting and Social Change. Volume 153. doi:10.1016/j.techfore.2020.119929.

Joutsenlahti, J.P. et al. (2021) Challenges and governance solutions for data science services based on open data and APIs. 2021 IEEE/ACM 1st Workshop on AI Engineering – Software Engineering for AI (WAIN). doi:10.1109/WAIN52551.2021.00012.

Panagiotis, B., Lanning, I. and Heavy, C. (2015) A survey of open source data science tools. International Journal of Intelligent Computing and Cybernetics. Volume 8, Number 3, pp.232- 261. doi:10.1108/IJICC-07-2014-0031.

Pasupuleti, M.B. (2015) Problems from the Past, Problems from the Future, and Data Science Solutions. ABC Journal of Advanced Research'. Volume 4, Issue 2. doi:10.18034/abcjar.v4i2.614.

Zaman, R. and Hassani, M. (2020) On enabling GDPR compliance in business process through data-driven solutions. SN Computer Science. Article number 210. doi:10.1007/s42979-020-00215-x.

Reading:

Kolb, J. (2013) Business Intelligence in Plain Language: A practical guide to Data Mining and Business Analytics. CreateSpace Independent Publishing Platform.

Provost, F. and Fawcett, T. (2013) Data Science for Business: What you need to knowledge about data mining and data-analytic thinking. O'Reilly.

VanderPlas, J. (2016) Python Data Science Handbook: Tools and Techniques for Developers: Essential Tools for Working with Data. O'Reilly.

HN Global:

HN Global HN Global (2021) Reading Lists. Available at: https://hnglobal.highernationals.com/learning-zone/reading-lists HN Global (2021) Student Resource Library. Available at: https://hnglobal.highernationals.com/subjects/resource-libraries HN Global (2021) Textbooks. Available at: https://hnglobal.highernationals.com/textbooks

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Discuss the use of data and information to support business processes and the value they have for an identified organisation		
P1 Discuss how data and information support business processes and the value they have for organisations. **P2** Discuss how data is generated and the tools used to manipulate it to form meaningful data to support business operations.	**M1** Assess the value of data and information to individuals and organisations in relation to real-world business processes.	**D1** Evaluate the wider implications of using data and information to support business processes in an identified organisation.
LO2 Discuss the implications of the use of data and information to support business processes in a real-world scenario		
P3 Discuss the social legal and ethical implications of using data and information to support business processes. **P4** Describe common threats to data and how they can be mitigated at on a personal and organisational level.	**M2** Analyse the impact of using data and information to support business real-world business processes.	

Pass	Merit	Distinction
LO3 Explore the tools and technologies associated with data science and how it supports business processes		
P5 Discuss how tools and technologies associated with data science are used to support business processes and inform decisions.	**M3** Assess the benefits of using data science to solve problems in real-world scenarios.	**D2** Evaluate the use of data science techniques against user and business requirements of an identified organisation.
LO4 Demonstrate the use of data science techniques to make recommendations to support real-world business problems		
P6 Design a data science solution to support decision making related to a real-world problem. **P7** Implement a data science solution to support decision making related to a real-world problem.	**M4** Make justified recommendations that support decision making related to a real-world problem.	