MDP1 — MDP1 TASK 2: DESIGN AND DEVELOPMENT

COMPUTER SCIENCE CAPSTONE — C964

PRFA — MDP1

COMPETENCIES

981.1.1 : Computer Science Capstone
The graduate integrates and synthesizes competencies from across the degree program, thereby demonstrating the ability to participate in and contribute value to the chosen professional field.

INTRODUCTION

In this task, you will design, develop, and implement the capstone project approved by your course instructor.

Your work for this task will not be evaluated until the appropriate forms from Task 1 have been submitted and evaluated.

REQUIREMENTS

Your submission must be your original work. No more than a combined total of 30% of the submission and no more than a 10% match to any one individual source can be directly quoted or closely paraphrased from sources, even if cited correctly. An originality report is provided when you submit your task that can be used as a guide.

You must use the rubric to direct the creation of your submission because it provides detailed criteria that will be used to evaluate your work. Each requirement below may be evaluated by more than one rubric aspect. The rubric aspect titles may contain hyperlinks to relevant portions of the course.

A. Create a letter of transmittal and a project proposal to convince senior, non-technical managers and executives to implement the data product you have designed. The proposal should include *each* of the following:

- a summary of the problem
- a description of how the data product benefits the customer and supports the decision-making process
- an outline of the data product
- a description of the data that will be used to construct the data product
- the objectives and hypotheses of the project
- an outline of the project methodology
- funding requirements

- the impact of the solution on stakeholders
- ethical and legal considerations and precautions that will be used when working with and communicating about sensitive data
- your expertise relevant to the solution you propose

Note: Expertise described here could be real or hypothetical to fit the project topic you have created.

B. Write an executive summary directed to IT professionals that addresses *each* of the following requirements:

- the decision-support problem or opportunity you are solving for
- a description of the customers and why this product will fulfill their needs
- existing gaps in the data products you are replacing or modifying (if applicable)
- the data available or the data that needs to be collected to support the data product lifecycle
- the methodology you use to guide and support the data product design and development
- deliverables associated with the design and development of the data product
- the plan for implementation of your data product, including the anticipated outcomes from this development
- the methods for validating and verifying that the developed data product meets the requirements and subsequently the needs of the customers
- the programming environments and any related costs, as well as the human resources that are necessary to execute *each* phase in the development of the data product
- a projected timeline, including milestones, start and end dates, duration for *each* milestone, dependencies, and resources assigned to *each* task

C. Design and develop a fully functional data product that addresses your identified business problem or organizational need. Include *each* of the following attributes as they are the minimum required elements for the product:

- **one** descriptive method and **one** non-descriptive (predictive or prescriptive) method
- collected or available datasets
- decision-support functionality
- ability to support featurizing, parsing, cleaning, and wrangling datasets
- methods and algorithms supporting data exploration and preparation
- data visualization functionalities for data exploration and inspection
- implementation of interactive queries
- implementation of machine-learning methods and algorithms
- functionalities to evaluate the accuracy of the data product
- industry-appropriate security features
- tools to monitor and maintain the product
- a user-friendly, functional dashboard that includes *at least* **three** visualization types

D. Create *each* of the following forms of documentation for the product you have developed:

- a business vision or business requirements document
- raw and cleaned data sets with the code and executable files used to scrape and clean data (if applicable)
- code used to perform the analysis of the data and construct a descriptive, predictive, or prescriptive data product
- assessment of the hypotheses for acceptance or rejection
- visualizations and elements of effective storytelling supporting the data exploration and preparation, data analysis, and data summary, including the phenomenon and its detection

- assessment of the product's accuracy
- the results from the data product testing, revisions, and optimization based on the provided plans, including screenshots
- source code and executable file(s)
- a quick start guide summarizing the steps necessary to install and use the product

E. Acknowledge sources, using in-text citations and references, for content that is quoted, paraphrased, or summarized.

F. Demonstrate professional communication in the content and presentation of your submission.

File Restrictions

File name may contain only letters, numbers, spaces, and these symbols: ! - _ . * ' ( )
File size limit: 200 MB
File types allowed: doc, docx, rtf, xls, xlsx, ppt, pptx, odt, pdf, txt, qt, mov, mpg, avi, mp3, wav, mp4, wma, flv, asf, mpeg, wmv, m4v, svg, tif, tiff, jpeg, jpg, gif, png, zip, rar, tar, 7z

RUBRIC

PROGRAM OUTCOME 1:THE GRADUATE APPLIES CORE INFORMATION TECHNOLOGY SKILLS IN IT SYSTEMS, OPERATING SYSTEMS, NETWORKING, SECURITY, SCRIPTING AND PROGRAMMING, DATA MANAGEMENT, PROJECT MANAGEMENT, AND WEB DEVELOPMENT TO SUPPORT ORGANIZATIONAL FUNCTIONS.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to apply core information technology skills to support organizational functions.	The submission demonstrates the ability to apply core information technology skills in some, but not all of the following areas: IT systems operating systems, networking, security, scripting and programming, data management, project management, and web development to support organizational functions.	The submission demonstrates the ability to apply core information technology skills in each of the following areas: IT systems, operating systems, networking, security, scripting and programming, data management, project management, and web development to support organizational functions.

PROGRAM OUTCOME 2:THE GRADUATE WILL BE ABLE TO SOLVE COMPUTING PROBLEMS USING CRITICAL THINKING AND MATHEMATICAL REASONING.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to solve computing problems.	The submission demonstrates the ability to solve computing problems, but the solution does not use both critical thinking and mathematical reasoning.	The submission demonstrates the ability to solve computing problems using both critical thinking and mathematical reasoning.

PROGRAM OUTCOME 3:THE GRADUATE WILL BE ABLE TO DEVELOP SECURE SOFTWARE SYSTEMS TO SUPPORT ORGANIZATIONAL GOALS AND NEEDS.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to develop secure software systems.	The submission demonstrates the ability to develop secure software systems, but the software systems do not support organizational goals and needs.	The submission demonstrates the ability to develop secure software systems that support organizational goals and needs.

PROGRAM OUTCOME 4:THE GRADUATE WILL BE ABLE TO ANALYZE THE IMPACT OF COMPUTING ON INDIVIDUALS, ORGANIZATIONS, AND SOCIETY IN RELATION TO PROFESSIONAL, SOCIAL, ETHICAL, LEGAL, SECURITY, BUSINESS, AND GLOBAL ISSUES AND RESPONSIBILITIES.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to analyze the impact of computing on individuals, organizations, and society.	The submission demonstrates the ability to analyze the impact of computing on individuals, organizations, and society, but it does not relate the impact to professional, social, ethical, legal, security, business, or global issues and responsibilities.	The submission demonstrates the ability to analyze the impact of computing on individuals, organizations, and society in relation to professional, social, ethical, legal, security, business, and global issues and responsibilities.

PROGRAM OUTCOME 5:THE GRADUATE WILL BE ABLE TO CREATE COMPUTER-BASED SOLUTIONS USING AUTONOMOUS FRAMEWORKS AND ALGORITHMS.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to create computer-based solutions.	The submission demonstrates the ability to create computer-based solutions, but the solutions do not use autonomous frameworks or algorithms.	The submission demonstrates the ability to create computer-based solutions using both autonomous frameworks and algorithms.

PROGRAM OUTCOME 6:THE GRADUATE WILL BE ABLE TO USE EFFECTIVE COMMUNICATION AND TEAM-FOCUSED SKILLS, AND RECOGNIZE THE NEED FOR PROFESSIONAL DEVELOPMENT AND LIFE-LONG LEARNING.

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not demonstrate the ability to use effective communication and team-focused skills.	The submission demonstrates the ability to use effective communication and team-focused skills, but it does not recognize the need for professional development or life-long learning.	The submission demonstrates the ability to use effective communication and team-focused skills, and it recognizes the need for professional development and life-long learning.

E. SOURCES:

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not include both in-text citations and a reference list for sources that are quoted, paraphrased, or summarized.	The submission includes in-text citations for sources that are quoted, paraphrased, or summarized and a reference list; however, the citations or reference list is incomplete or inaccurate.	The submission includes in-text citations for sources that are properly quoted, paraphrased, or summarized and a reference list that accurately identifies the author, date, title, and source location as available.

F. PROFESSIONAL COMMUNICATION:

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
Content is unstructured, is disjointed, or contains pervasive errors in mechanics, usage, or grammar. Vocabulary or tone is unprofessional or distracts from the topic.	Content is poorly organized, is difficult to follow, or contains errors in mechanics, usage, or grammar that cause confusion. Terminology is misused or ineffective.	Content reflects attention to detail, is organized, and focuses on the main ideas as prescribed in the task or chosen by the candidate. Terminology is pertinent, is used correctly, and effectively conveys the intended meaning. Mechanics, usage, and grammar promote accurate interpretation and understanding.