**London Metropolitan University, Faculty of Computing**

# CS6003ES Advanced Software Engineering

**Coursework Assignment, Semester 2 (part 2), 2023/24**

**Module Leader:**  Dr. Lochandaka Ranathunga

**Part 2 weighting: 30% in total**

## STUDENT ID NUMBERS: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**NAMES**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Submission deadline:

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| --- | --- |
| **To submit at the module Weblearn with all documents to your** | |
| **tutor** |  |

**The electronic version of your individual report must indicate ID number, Surname and First name in the first page or at the beginning of program file (as comments).**

*If you think there is a good reason for late submission, such as illness, and you have supporting documentary evidence then you should follow the “mitigating circumstance” procedures outlined in the Red Book, otherwise assignments will NOT be accepted by the module Organizer after the due date.*

**PLAGIARISM**

You are reminded that there exist regulations concerning plagiarism. Extracts from these regulations are printed overleaf. Please sign below to say that you have read and understand these extracts:

(Signature:)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**This header sheet should be attached to the assignment specification and to the work you submit. No work will be accepted without it.**

**Extracts from *University: Regulations on Cheating, Plagiarism and Collusion***

Section 2.3: *“The following broad types of offence can be identified and are provided as indicative examples …..*

1. *Cheating: including taking unauthorized material into an examination; consulting unauthorized material outside the examination hall during the examination; obtaining an unseen examination paper in advance of the examination; copying from another examinee; using an unauthorized calculator during the examination or storing unauthorized material in the memory of a programmable calculator which is taken into the examination; copying coursework.*
2. *Falsifying data in experimental results.*
3. *Personation, where a substitute takes an examination or test on behalf of the candidate. Both candidate and substitute may be guilty of an offence under these Regulations.*
4. *Bribery or attempted bribery of a person thought to have some influence on the candidate’s assessment.*
5. *Collusion to present joint work as the work solely of one individual.*
6. *Plagiarism, where the work or ideas of another are presented as the candidate’s own. (vii) Other conduct calculated to secure an advantage on assessment. (viii) Assisting in any of the above.*

**Some notes on what this means for students:**

1. Copying another student's work is an offence, whether from a copy on paper or from a computer file, and in whatever form the intellectual property being copied takes, including text and computer programs.

1. Taking extracts from published sources *without attribution* is an offence. To quote ideas, sometimes using extracts, is generally to be encouraged. Quoting ideas is achieved by stating an author's argument and attributing it, perhaps by quoting, immediately in the text, his or her name and year of publication, e.g. " e = mc2 (Einstein 1905)". A *references* section at the end of your work should then list all such references in alphabetical order of authors' surnames. (There are variations on this referencing system, which your tutors may prefer you to use.) If you wish to quote a paragraph or so from published work then indent the quotation on both left and right margins, using an italic font where practicable, and introduce the quotation with an attribution.

**CS6003 – Advanced Software Engineering COURSEWORK PART 2**

**SUBMISSION DEADLINE:**

**1. The Task of part 2 of the Coursework**

This part of your *Coursework* is to write a *Project Plan Report1,* prepared with *MS Word* (your file must be submitted in a *MS Word 2007/2010/2012/2016* format).

The form and structure of the *Report* must correspond to the *SE documentation template* (in the module *WebLearn).*

## 2. Task Description

*You are a Developer in* software solution team which *specializes mainly in development of web-based software products.*

*Your company is involved in development of system* for “*City Taxi*”. (See the scenario in Part 1 of the coursework).

*In this* Part, *you are playing* ***the role*****of the project manager** *and do some* Scope Management, Time Management, *and* Human Resource Management *tasks for your* software project. *You shall do the following:*

1. *Write* Generic Report (Plan) Information *(page 12* of IEEE 12207.1):
   1. *Date of issue and status;*
   2. *Issuing organization;*
   3. *Glossary*

1. *Write an* Overview (Project Summary) *for your* software project.
2. 'Hand-pick' your team. The team consists of you, three full-time members and two people working not more than 50% of their time. You, as the project manager, shall take part in Project Process (see ISO 12207-2008) activities only (that is definitely part-time, <= 50%) and cannot take part in any Software Implementation Processes. Full-time people may be used in Software Implementation Processes activities mainly; part-time people may be used in any process. If you find that '50%-people' cannot cover all support and other processes, give an explanation why and give estimation what load should be put on part-time workers. You earn £25 per hour. Two members of your team and a part-time member earn £35 per hour and others earn £50 per hour.

In your plan, give a short description of each member of your team: name, background, specialization, salary, etc.

Plan your project for three months (12 weeks) to complete; it will cost £100,000. This amountof money is the salary of your team only; there is no need to plan other expenses.

1. Describe organizational structure (as a chart + an explanation) of your team and give a budget summary.
2. Develop a Work Breakdown Structure (WBS) for your software project and schedule the Project. The WBS must be based on the ISO 12207-2008 tasks, activities, and processes.

In addition to your WBS, allocate members of your team to the project tasks and develop a **Gantt chart**. If you present an activity network (AOA) with any of ES, EF, LS, LF, Slack, you will have some additional marks; then you need to give an explanation to the diagram in your report. Do not forget to include all Project and Software Support Processes *in your* Gantt chart *(and the* network diagram, *if you do it).*

Suggestion: using *MS Project to develop the project planning.*

*All software product names in your* Report *must correspond to ones from* IEEE 12207.1-1997.

**3Submission:** XXXX

4. The Criteria (Marking Scheme)

|  |  |
| --- | --- |
| ***Component*** | **Marks** |
| ***1. Contents of this Report Body:*** | **(90%)** |
| **1) Generic plan information for managing the project:**  a) Date of issue and status; b)Issuing organisation; c) Glossary | **5%** |
| ***2) Overview (Project summary):***  a) Purpose, scope, and objectives; b) Assumptions and constraints;  c) Project deliverables; d) Schedule and budget summary. | **15%** |
| ***3) Project organisational structure:***   1. Description of the team structure, 2. Identification of team member responsibilities for software processes, activities and tasks; | **20%** |
| **4) Work breakdown structure (WBS):**   1. WBS itself as a set of tasks of ISO 12207-2008 processes; 2. Rationale for this WBS (with explanations for particular pieces of work on your particular software products corresponding to Part 1 and IEEE 12207.1) 3. Gantt chart (with corresponding explanation) 4. Milestones that can be assessed using objective indicators to evaluate the scope and quality of work products completed at those milestones 5. Rationale for this set of milestones | **( 50%)**  **12%**  **13%**  **15%**  **4%**  **6%** |
| ***2. Correspondence to SE documentation template*:**  Cover page, Table of contents, Introduction, Format of references, Format of glossary, Format of illustrations, Format of body text, Structure of the document, Page format | **10%** |
| **Total** | **100%** |

1. Introduction

The urban transportation landscape is swiftly evolving, with taxi services playing an increasingly crucial role in meeting the mobility needs of city residents. City Taxi (PVT) Ltd recognizes the necessity to adapt to these changes and is dedicated to enhancing its service offerings to better cater to its target demographic of low to mid-income passengers. In response to the rising demand for convenient and dependable transportation options, City Taxi (PVT) Ltd has initiated a project to develop a web-based taxi reservation system.

This project aims to transform the way passengers book taxis by providing a seamless and efficient online platform for reservations. By harnessing modern technology and user-friendly interfaces, the system aims to simplify the booking process, allowing passengers to reserve taxis effortlessly from their homes or while on the move. Furthermore, the system will empower passengers to access real-time information about vehicle availability, estimated arrival times, and driver details, thereby fostering transparency and trust in the service.

At the core of the system lies a commitment to delivering outstanding customer experiences. Passengers can anticipate prompt and reliable service, with drivers who are courteous, professional, and well-prepared to meet their needs. Additionally, the system will integrate features such as passenger feedback mechanisms, enabling City Taxi (PVT) Ltd to continuously enhance its services based on customer input.

For drivers, the system offers enhanced visibility and opportunities for earning potential. With features such as automatic availability status updates and integrated payment processing, drivers can efficiently manage their schedules and finances, maximizing their earning potential while delivering exceptional service to passengers.

In summary, the development of a web-based taxi reservation system signifies a significant advancement for City Taxi (PVT) Ltd in its mission to provide convenient, reliable, and customer-centric transportation solutions. By embracing innovation and leveraging technology, City Taxi (PVT) Ltd aims to strengthen its position as a preferred choice for urban commuters, delivering unparalleled convenience, quality, and value with every ride.

# Generic Plan Information

Version 1.0

Issuing organization: “City Taxi (PVT) Ltd”.

Date of issue:

Status: **Ongoing**

**Glossary**

The following are the list of conventions and acronyms used in the document:

**Document Conventions**

• Entire document should be justified.

• Line spacing for text is 1.5.

• The references are written according to the Harvard format.

• Convention for Main title

▪ Font face: Times New Roman

▪ Font style: Bold

▪ Font Size: 12

• Convention for Sub title

▪ Font face: Times New Roman

▪ Font style: Bold

▪ Font Size: 12

• Convention for body

▪ Font face: Times New Roman

▪ Font Size: 12

**Acronyms**

- SQL: Structured Query Language

- CSS: Cascading Style Sheet

- GUI: Graphical User Interface

- HTML: Hyper Text Markup Language

- WBS: Work Breakdown Structure

- SDLC: System Development Life Cycle

- UML: Unified Modeling Language

1. Overview

Online taxi booking apps are transforming urban commutes, providing passengers with a seamless experience. With just a few taps on your phone, you can book rides, track your taxi's arrival in real-time, and select from various cashless payment options. These apps offer transparency by allowing users to access driver and vehicle details and provide feedback to enhance the service. Drivers also benefit from efficient trip management, increased visibility through real-time availability updates, and direct communication with passengers. Acting as a bridge between the company and customers, these apps streamline the booking process, with the company owner serving as the admin and appointing officials to assist in managing customers and rides. Overall, these apps offer a convenient and efficient booking experience, providing real-time information on vehicle availability, estimated arrival times, and driver details.

## 3.1 Purpose

The aim of this project is to develop a web-based application for City Taxi (PVT) Ltd, commencing on January 21, 2024, and concluding on April 21, 2024. The goal is to enhance the user experience for customers utilizing the service, as well as to boost efficiency and improve overall service delivery through the effective application of technology in daily operations.

**3.2.** Scope and objectives

### **3.2.1 Scope**

While acknowledging the ongoing need for enhancements, the current system's interface offers a foundational glimpse into the record-keeping framework now established. In delineating the scope for improvement, four primary tasks must be undertaken:

1. Identifying potential areas for enhancement, followed by detailed analysis of each identified aspect.

2. Predicting the likely impact of proposed changes on at least two criteria, such as net profit increase and service quality alteration.

3. Estimating the probability of adoption for the newer application.

4. Assessing the speed at which the implemented improvements will yield tangible benefits.

Given the need for case-specific analysis, predictive models of varying complexities will be employed. Due to the anticipatory nature of these predictions, they inherently entail estimations of probabilities regarding the balance between benefits and costs or positive and negative factors.

### **3.2.2. Objectives**

The objective of this thesis is to develop a web application for City Taxi (PVT) Ltd, empowering the administrator to manage ride bookings online. The application will facilitate the management of operators, customers, and driver details, while customers can easily book and ride. Payment transactions will be conducted via the PayPal testing environment, with email or system notifications sent upon ride completion.

General Objectives:

1. Enhance operational efficiency and improve customer services through the effective use of technology in daily operations.

2. Foster stronger customer relations.

Specific Objectives:

1. Overcome physical constraints by offering online booking services.

2. Enable customers to conveniently purchase rides with a few clicks.

3. Expand reach to attract more customers and increase revenue.

4. Provide round-the-clock access to services for customers worldwide.

5. Ensure accurate order placement through visual confirmation.

6. Reduce business operational costs.

7. Streamline processes by eliminating paperwork and enhancing accuracy.

8. Boost service speed, sales volume, and customer satisfaction.

## 3.3. Assumptions and Constraints

### **3.3.1. Assumptions**

As a project manager, gathering and identifying assumptions is crucial for developing a comprehensive risk management plan. Here are some examples of assumptions:

1. You will have access to all necessary resources for the project.

2. Cheap labor will be readily available during the rainy season.

3. All relevant stakeholders will attend the upcoming meeting.

### **3.3.2. Constraints**

Time Constraint: This refers to the project's schedule, including deadlines for each phase and the final deliverable rollout date.

Scope Constraint: The scope outlines the project's specific goals, deliverables, features, and functions, along with the necessary tasks for completion.

Cost Constraint: The project's cost, or budget, encompasses all financial resources required to complete the project within its specified time frame and predetermined scope. This includes expenses for materials, labor, vendors, quality control, and other pertinent factors.

3.4 Scope Management

Scope Management for the City Taxi project involves defining and controlling what is included and excluded in the project to ensure its successful completion within the specified parameters. Here's a meaningful Scope Management plan:

1. Scope Definition:

- Clearly define the project's objectives, which include developing a web application for City Taxi (PVT) Ltd.

- Identify the specific features and functionalities of the web application, such as admin management, operator management, customer booking, and driver details management.

- Determine the boundaries of the project, outlining what is included (e.g., payment transaction integration, email notifications) and excluded (e.g., unrelated software development) from scope.

2. Scope Planning:

- Develop a detailed project scope statement that documents the project's objectives, deliverables, assumptions, constraints, and acceptance criteria.

- Create a Work Breakdown Structure (WBS) to decompose the project scope into manageable tasks and subtasks.

- Establish a change management process to handle scope changes, ensuring that any alterations are properly evaluated and approved before implementation.

3. Scope Verification:

- Regularly review project deliverables against the defined scope to ensure alignment with stakeholders' expectations.

- Seek validation from stakeholders to confirm that project deliverables meet their requirements and satisfy the project's objectives.

- Document any discrepancies or deviations from the scope and take appropriate corrective actions if necessary.

4. Scope Control:

- Monitor project activities to prevent scope creep and ensure that the project remains within the defined boundaries.

- Implement effective change control procedures to evaluate and approve/disapprove scope changes based on their impact on project objectives, schedule, and budget.

- Communicate any approved scope changes to relevant stakeholders and update project documentation accordingly.

- Continuously assess project performance against the defined scope and take proactive measures to address any deviations or risks that may impact scope adherence.

By effectively managing the project scope throughout its lifecycle, the City Taxi project can maintain focus on its objectives, minimize scope-related risks, and deliver a successful web application that meets stakeholders' expectations.

**Risk Management**

Risk Management for the development of the web-based application for City Taxi (PVT) Ltd involves identifying, assessing, and mitigating potential risks that could impact the project's success. Here's a meaningful Risk Management plan:

1. Risk Identification:

a. Technical Risks:

- Insufficient expertise in web development technologies.

- Compatibility issues with different web browsers and devices.

b. Resource Risks:

- Shortage of skilled developers or technical resources.

- Delays in obtaining necessary hardware or software licenses.

c. Schedule Risks:

- Unforeseen complexities in development leading to schedule slippage.

- Dependencies on external factors such as third-party integrations or regulatory approvals.

d. Security Risks:

- Vulnerabilities in the application leading to data breaches or cyberattacks.

- Inadequate measures to protect sensitive customer information.

e. Stakeholder Risks:

- Misalignment of expectations between stakeholders regarding project scope, timeline, or budget.

- Lack of engagement or communication from key stakeholders.

f. Financial Risks:

- Cost overruns due to underestimation of project expenses or scope changes.

- Fluctuations in currency exchange rates impacting project budget.

2. Risk Assessment:

- Prioritize identified risks based on their likelihood and potential impact on project objectives.

- Assign a risk rating to each identified risk, considering factors such as severity, probability, and detectability.

- Determine the tolerance level for each risk, indicating the threshold at which action must be taken to mitigate or manage the risk.

3. Risk Mitigation and Response Planning:

- Develop risk mitigation strategies for high-priority risks, focusing on proactive measures to reduce their likelihood or impact.

- Implement contingency plans for risks that cannot be entirely eliminated, outlining predetermined responses to minimize their consequences.

- Allocate resources and responsibilities for executing risk mitigation and response activities.

- Regularly review and update the risk management plan as new risks emerge or existing risks evolve throughout the project lifecycle.

4. Risk Monitoring and Control:

- Continuously monitor the project environment for new risks and changes in existing risks.

- Track the effectiveness of implemented risk mitigation strategies and adjust as necessary to address evolving circumstances.

- Communicate risk status and updates to relevant stakeholders, ensuring transparency and alignment on risk management efforts.

- Conduct regular reviews and audits to assess the overall effectiveness of the risk management process and identify areas for improvement.

By proactively identifying, assessing, and addressing potential risks, the City Taxi project can enhance its resilience to challenges and increase the likelihood of achieving its objectives within the defined constraints.

Risk Management for the development of the web-based application for City Taxi (PVT) Ltd involves identifying potential risks and implementing strategies to mitigate or manage them effectively.

1. Bad Timing:

- Risk: Delays in project milestones due to unforeseen circumstances or poor time management.

- Mitigation:

- Conduct comprehensive project planning to establish realistic timelines and milestones.

- Incorporate buffer time into the schedule to account for unexpected delays or setbacks.

- Regularly monitor project progress and identify potential schedule risks early to implement timely corrective actions.

2. Incorrect Budget Estimation:

- Risk: Underestimation of project costs leading to budget constraints or cost overruns.

- Mitigation:

- Conduct thorough cost estimation, considering all aspects of the project, including resources, technology, and potential risks.

- Include contingency funds in the budget to address unforeseen expenses or scope changes.

- Implement robust cost tracking and reporting mechanisms to monitor expenditure and identify variances from the budget.

3. Poor Code Quality and Technical Risks:

- Risk: Technical issues, bugs, or poor code quality that compromise the functionality and reliability of the web application.

- Mitigation:

- Implement best practices for software development, including code reviews, testing, and documentation.

- Utilize experienced and skilled developers proficient in relevant technologies to ensure high-quality code.

- Conduct regular quality assurance and testing throughout the development process to identify and address technical risks early.

4. User Engagement:

- Risk: Inadequate user engagement leading to dissatisfaction or disinterest in the web application.

- Mitigation:

- Involve stakeholders and end-users in the project from the early stages to gather feedback and requirements.

- Conduct user research and usability testing to understand user preferences and expectations.

- Implement features and functionalities that enhance user experience and promote user engagement, such as intuitive interfaces and personalized services.

- Establish effective communication channels to solicit feedback and address user concerns promptly.

By proactively identifying and addressing these risks, the City Taxi project can minimize the likelihood of negative impacts on project outcomes and increase the probability of delivering a successful web application that meets stakeholder expectations.

User

PROJECT CLOSURE

Project Closure for the development of the web-based application for City Taxi (PVT) Ltd involves wrapping up all project activities, evaluating the project's success, and transitioning deliverables to stakeholders. Here's how it can be executed based on the given scenario:

1. Documentation and Deliverable Handover:

- Compile all project documentation, including project plans, requirements documents, design specifications, test reports, and user manuals.

- Ensure that all deliverables, such as the completed web application, source code, and relevant assets, are handed over to the appropriate stakeholders.

- Conduct a formal handover process, including training sessions or knowledge transfer sessions, to ensure stakeholders are equipped to use and maintain the delivered product.

2. Evaluation and Lessons Learned:

- Assess the project's performance against its objectives, including schedule adherence, budget compliance, and achievement of scope.

- Conduct a post-project review with the project team and key stakeholders to identify successes, challenges, and areas for improvement.

- Document lessons learned from the project, including what worked well, what didn't, and recommendations for future projects.

- Use insights gained from the evaluation to inform future project planning and decision-making within the organization.

3. Closure Activities:

- Communicate project closure to all stakeholders, including team members, sponsors, and end-users, through formal announcements or reports.

- Release any remaining project resources, such as equipment or personnel, and update organizational records accordingly.

- Close out financial accounts and ensure all project-related expenses and invoices are settled.

- Archive project documentation and files in a centralized repository for future reference or audit purposes.

4. Celebrate Achievements:

- Recognize and celebrate the efforts and contributions of the project team and stakeholders in successfully delivering the web-based application.

- Host a project closure meeting or event to acknowledge accomplishments, share experiences, and express appreciation for everyone involved.

- Foster a positive team environment by reflecting on achievements and reinforcing collaboration and teamwork.

By following these steps, the City Taxi (PVT) Ltd project can achieve a smooth and effective closure, ensuring that project objectives are met, stakeholders are satisfied, and valuable insights are captured for future endeavors.

**09. GANTT CHART FOR THE PROJECT**

Gantt charts visually display tasks plotted over time, showcasing essential project details like task assignments, durations, and task dependencies. They illustrate task completion within a project using timelines, highlighting the sequence and interrelation of various activities. Gantt charts serve as valuable tools for comprehending project activities and tracking progress effectively.

CONCLUSION

In conclusion, the development of the web-based application for City Taxi (PVT) Ltd marks a significant milestone in enhancing urban transportation services. By leveraging modern technology and user-friendly interfaces, the project aims to revolutionize the way passengers book taxis, providing a seamless and efficient online platform for reservations. Throughout the project, careful consideration has been given to addressing key objectives, including increasing efficiency, improving customer relations, and ensuring user engagement.

The project has successfully navigated various challenges, such as managing time constraints, budget estimations, and technical risks, through proactive risk management strategies. By adhering to best practices in project management, the team has delivered a high-quality web application that meets stakeholder expectations and enhances the overall service offerings of City Taxi (PVT) Ltd.

As the project concludes, it is imperative to conduct a thorough evaluation of its performance and capture lessons learned for future endeavors. This will enable the organization to build upon successes, address shortcomings, and continuously improve its processes and delivery capabilities.

Overall, the successful completion of the web-based application project signifies a commitment to innovation, customer-centricity, and excellence in service delivery. It positions City Taxi (PVT) Ltd as a preferred choice for urban commuters, offering unparalleled convenience, reliability, and value with every ride.