Student Declaration of Authorship

HERIOT WATT UNIVERSITY
UK | DUBAI | MALAYSIA

Course code and name:	Advance Software Engineering (F21AS)
Type of assessment:	**Group**
Coursework Title:	CW Stage 1 – Development Plan
Student Name:	Ahmad Kakar
Student ID Number:	H00418426

Declaration of authorship. By signing this form:

- **I declare** that the work I have submitted for individual assessment OR the work I have contributed to a group assessment, is entirely my own. I have NOT taken the ideas, writings or inventions of another person and used these as if they were my own. My submission or my contribution to a group submission is expressed in my own words. Any uses made within this work of the ideas, writings or inventions of others, or of any existing sources of information (books, journals, websites, etc.) are properly acknowledged and listed in the references and/or acknowledgements section.
- I confirm that I have read, understood and followed the University's Regulations on plagiarism as published on the University's website, and that I am aware of the penalties that I will face should I not adhere to the University Regulations.
- I confirm that I have read, understood and avoided the different types of plagiarism explained in the University guidance on Academic Integrity and Plagiarism

Student Signature *(Ahmad Kakar)*: 

Date: *17/02/2023*

Copy this page and insert it into your coursework file in front of your title page.
For group assessment each group member must sign a separate form and all forms must be included with the group submission.

Student Declaration of Authorship

HERIOT WATT UNIVERSITY
UK | DUBAI | MALAYSIA

Course code and name:	F21AS – Advanced Software Engineering
Type of assessment:	**Group**
Coursework Title:	CW Stage 1 – Development Plan
Student Name:	Roshni Kashetty
Student ID Number:	H00414006

Declaration of authorship. By signing this form:

- **I declare** that the work I have submitted for individual assessment OR the work I have contributed to a group assessment, is entirely my own. I have NOT taken the ideas, writings or inventions of another person and used these as if they were my own. My submission or my contribution to a group submission is expressed in my own words. Any uses made within this work of the ideas, writings or inventions of others, or of any existing sources of information (books, journals, websites, etc.) are properly acknowledged and listed in the references and/or acknowledgements section.
- I confirm that I have read, understood and followed the University's Regulations on plagiarism as published on the University's website, and that I am aware of the penalties that I will face should I not adhere to the University Regulations.
- I confirm that I have read, understood and avoided the different types of plagiarism explained in the University guidance on Academic Integrity and Plagiarism

Student Signature *(type your name)*: *Roshni Kashetty*

Date: *1/02/2023*

Copy this page and insert it into your coursework file in front of your title page.
For group assessment each group member must sign a separate form and all forms must be included with the group submission.

Your work will not be marked if a signed copy of this form is not included with your submission.

Student Declaration of Authorship

HERIOT WATT UNIVERSITY
UK | DUBAI | MALAYSIA

Course code and name:	F21AS – Advanced Software Engineering
Type of assessment:	Group
Coursework Title:	CW Stage 1 – Development Plan
Student Name:	Seigha Kenekayoro
Student ID Number:	H00424793

Declaration of authorship. By signing this form:

- **I declare** that the work I have submitted for individual assessment OR the work I have contributed to a group assessment, is entirely my own. I have NOT taken the ideas, writings or inventions of another person and used these as if they were my own. My submission or my contribution to a group submission is expressed in my own words. Any uses made within this work of the ideas, writings or inventions of others, or of any existing sources of information (books, journals, websites, etc.) are properly acknowledged and listed in the references and/or acknowledgments section.

- I confirm that I have read, understood and followed the University's Regulations on plagiarism as published on the University's website, and that I am aware of the penalties that I will face should I not adhere to the University Regulations.

- I confirm that I have read, understood and avoided the different types of plagiarism explained in the University guidance on Academic Integrity and Plagiarism

Student Signature *(type your name)*: *Seigha Kenekayoro*

Date: *17/02/2023*

Copy this page and insert it into your coursework file in front of your title page.
For group assessment each group member must sign a separate form and all forms must be included with the group submission.

Your work will not be marked if a signed copy of this form is not included with your submission.

Student Declaration of Authorship

HERIOT WATT UNIVERSITY
UK | DUBAI | MALAYSIA

Course code and name:	F21AS – Advanced Software Engineering
Type of assessment:	**Group**
Coursework Title:	CW Stage 1 – Development Plan
Student Name:	Daniel Denley
Student ID Number:	H00419133

Declaration of authorship. By signing this form:

- **I declare** that the work I have submitted for individual assessment OR the work I have contributed to a group assessment, is entirely my own. I have NOT taken the ideas, writings or inventions of another person and used these as if they were my own. My submission or my contribution to a group submission is expressed in my own words. Any uses made within this work of the ideas, writings or inventions of others, or of any existing sources of information (books, journals, websites, etc.) are properly acknowledged and listed in the references and/or acknowledgements section.

- I confirm that I have read, understood and followed the University's Regulations on plagiarism as published on the University's website, and that I am aware of the penalties that I will face should I not adhere to the University Regulations.

- I confirm that I have read, understood and avoided the different types of plagiarism explained in the University guidance on Academic Integrity and Plagiarism

Student Signature *(type your name)*: *Daniel Denley*

Date: *17/02/2023*

Copy this page and insert it into your coursework file in front of your title page.
For group assessment each group member must sign a separate form and all forms must be included with the group submission.

Your work will not be marked if a signed copy of this form is not included with your submission.

Development Plan

Team 15 *Contributors: Daniel Denley, Roshni Kashetty, Seigha Kenekayoro, Ahmad Kakar*

Data Structures:

When deciding upon data structures we first considered what would be the most common function of our application. The application has vehicles assigned to a segment which along with their direction dictate which phase they are on. These phases represent lanes which the vehicles queue in. Each phase has an allotted time for a certain amount of vehicles to exit this queue before the next phase is commenced. From this we know that an implementation of a FIFO queue will give us efficient functionality of removing vehicles from the lane queue they are in, after research it was deemed that a linked list queue was the most suitable implementation for this. However when a vehicle is removed from this queue we do not want to dispose of the vehicle object, just update the status from waiting to crossed.

As we still want to hold the vehicles objects to display their information on the GUI and for use in the produced report we want to hold the vehicle objects in another data structure. Here the choice was taken to hold all vehicle objects in a hash table. Instead of holding the vehicle objects themselves in the FIFO queues representing the lanes/phases we instead only hold a vehicle ID. This vehicles ID is popped from the queue and then used to efficiently access the hash table and update the vehicle objects status property from waiting to crossed.

A final data structure, a hash table, is used to hold each vehicle ID queue representing the phases/lanes. Originally we planned to use a linked list to contain these queues as each phase is cycled sequentially during simulation and linked lists are efficient in retrieving the next object in the list. We instead chose a hash table as adding vehicles both initially and through the GUI meant we had to iterate over the entire linked list until the appropriate phase was found and in large amounts of phases this would become inefficient.

The data structures themselves can be found in the following classes:

- **Vehicles class:** Holds the hash table containing the Vehicle ID as a key and a vehicle object as the value.
- **Phases class:** Holds the hash table containing the Phase Number as a key and a phase object as the value.
- **Phase class**: Holds the linked list queue implementation. Each item in this queue holds the string vehicle id which when popped is used to access the vehicles hash table and update the relevant vehicle object.

Project Plan:

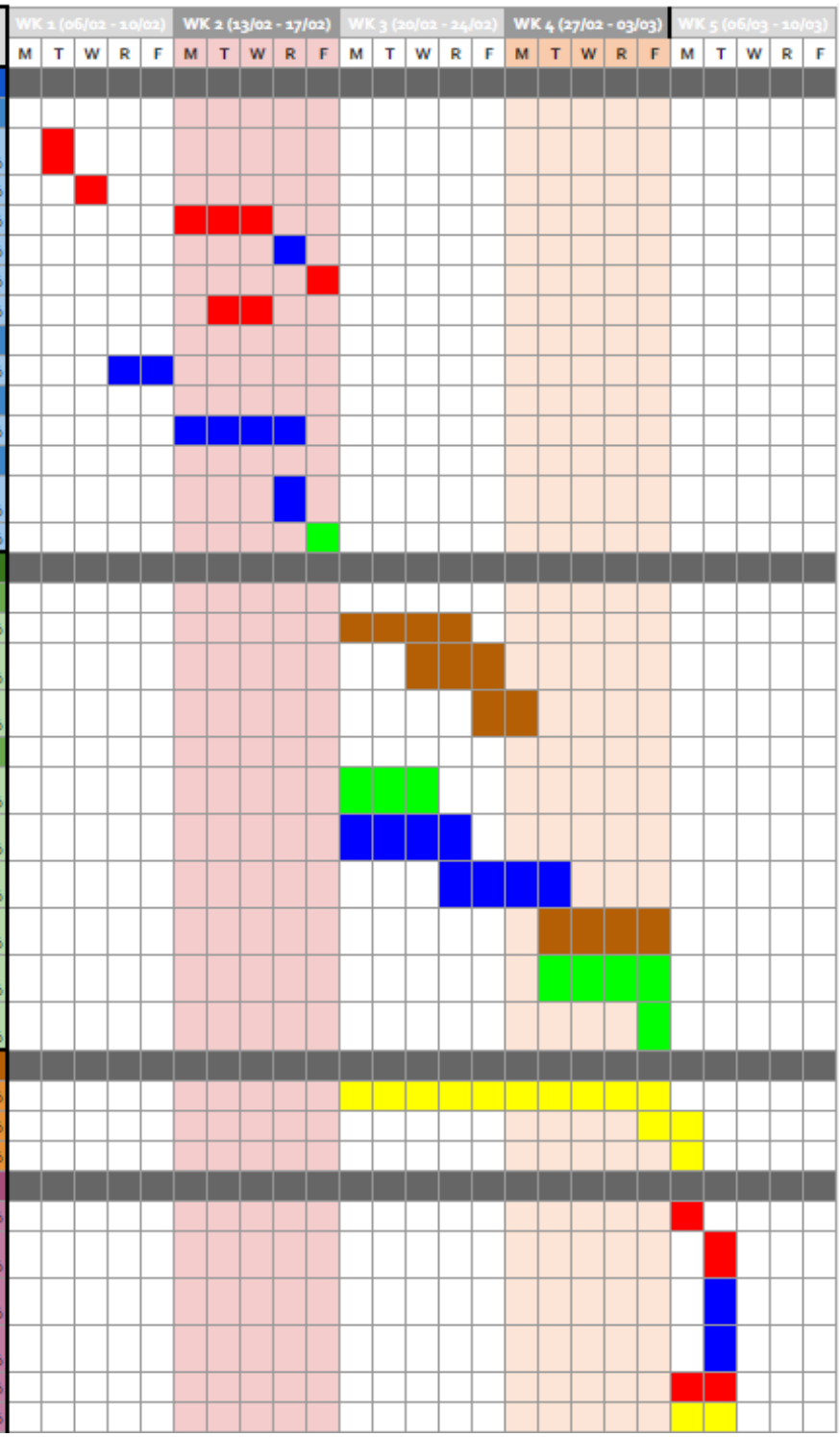
Once we had evaluated the project requirements and the required functionalities of our application we then proceeded to break down these functionalities into smaller development tasks which we allocated amongst ourselves. During our meeting we discussed our strengths and predicted timelines for us to complete each task. A Gannt chart was then created to display the timeline for our development and the division of tasks. Broadly development was split; GUI – Roshni, Backend – Daniel and Seigha, Testing and Exceptions – Ahmad.

In terms of iterative development it can be seen that at week three we expect to have developed a GUI and some base classes ready to provide functionality. At the start of week four this basic functionality is added and we have our first iteration of a final application. By the end of this week additional functionality is implemented to provide us a second iteration which we hope achieves all project requirements. Testing can be seen as performed throughout and indeed some classes we aim to take a test driven approach during there development.

Gannt Chart Key:

Red: Team, Blue: Daniel, Green: Seigha, Brown: Roshni, Yellow: Ahmad

Task NUMBER	TASK TITLE	TASK Completion
1	Planning and Design	
1.1	Project Plan	
1.1.1	Team Communications Created - MS Teams + Whatsapp	100%
1.1.2	Team Meeting Schedule Agreed	100%
1.1.3	Allocation of Tasks	100%
1.1.4	Creation of Gannt Chart	100%
1.1.5	Creation of Initial GitHub Backlog	100%
1.1.6	Agreement on additional functionallities	100%
1.2	Data Strucutres	
1.2.1	Data Structure Design Decison	100%
1.3	Class Diagram	
1.3.1	Creation of UML Class Diagram	100%
1.4	GUI Design	
1.4.1	Initial Sketch to show required functionallities	100%
1.4.2	Static GUI prototype for Java Swing	100%
2	Development	
2.1	GUI Development	
2.1.1	Java Swing Research / Learning	0%
2.1.2	GUI Frame and Components Implemented - Visually completed	0%
2.1.3	Implementation of Action Events - e.g. pressing a button calls a method	0%
2.2	Backend Development	
2.2.1	Reading of Initializer CSV files - "ReadCSV" class	0%
2.2.2	Vehicles and Vehicle classes - hashmap data structure and methods	0%
2.2.3	Phases and Phase classes - hashmap and FIFO queue data strucures and methods	0%
2.2.4	GUI statistics table backend methods implemented	0%
2.2.5	Methods for report information/statistics implemented	0%
2.2.6	Writing of report information to text file - "ProduceReport" class	0%
3	Testing	
3.1	JUnit Testing	0%
3.2	Integration Testing	0%
3.3	Functionallity Testing	0%
4	Report	
4.1	Introduction	0%
4.2	Evaluation of Specification - Did we meet requirements?	0%
4.3	UML Diagram - Possible revisions during development	0%
4.4	Data Strucuture Decisions - Possible revisions during development	0%
4.5	Functionallity Decisions	0%
4.6	Testing Evaluation	0%



Group communication will be handled through both a teams chat and a WhatsApp group for more urgent issues. The utilisation of GitHub will allow us to develop our allocated tasks asynchronously and keep everyone updated on progress through a GitHub project backlog.

Team meetings have been arranged biweekly. An in-person meeting Wednesday morning for pair-programming and a teams meeting on Saturdays for a weekly review of work achieved and possible development timeline problems.

UML Class Diagram: