COMP2211
Deliverable 2 - Project Envisioning
Report Group 23

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Introduction

In the first increment of the coursework our main plan was to set up the projects (windows, scenes) as well as create classes that take user input, calculate the requested values, and display these to the user. Furthermore, we also planned on implementing a basic visualisation with very little functionality. We have succeeded with most of these tasks. The only goal that was unachieved is to provide basic functionality to the visualisation. While it is present, and the object is proportional to the given input, no indicators have yet been placed.

This would be the purpose of the next increment: implement all the indicators, as well as create the scene for displaying both visualisations at the same time, if we have enough time in the next increment. There are other low priority tasks, such as: giving notifications to user whenever data changes, calculation steps displayed on request, and automatically rotate runway to the direction indicated in its name.

Below are some notes regarding the project and report:

The logbook contains all the feedback we received from our supervisor since the last submission. It also includes how we considered and implemented the feedback received.
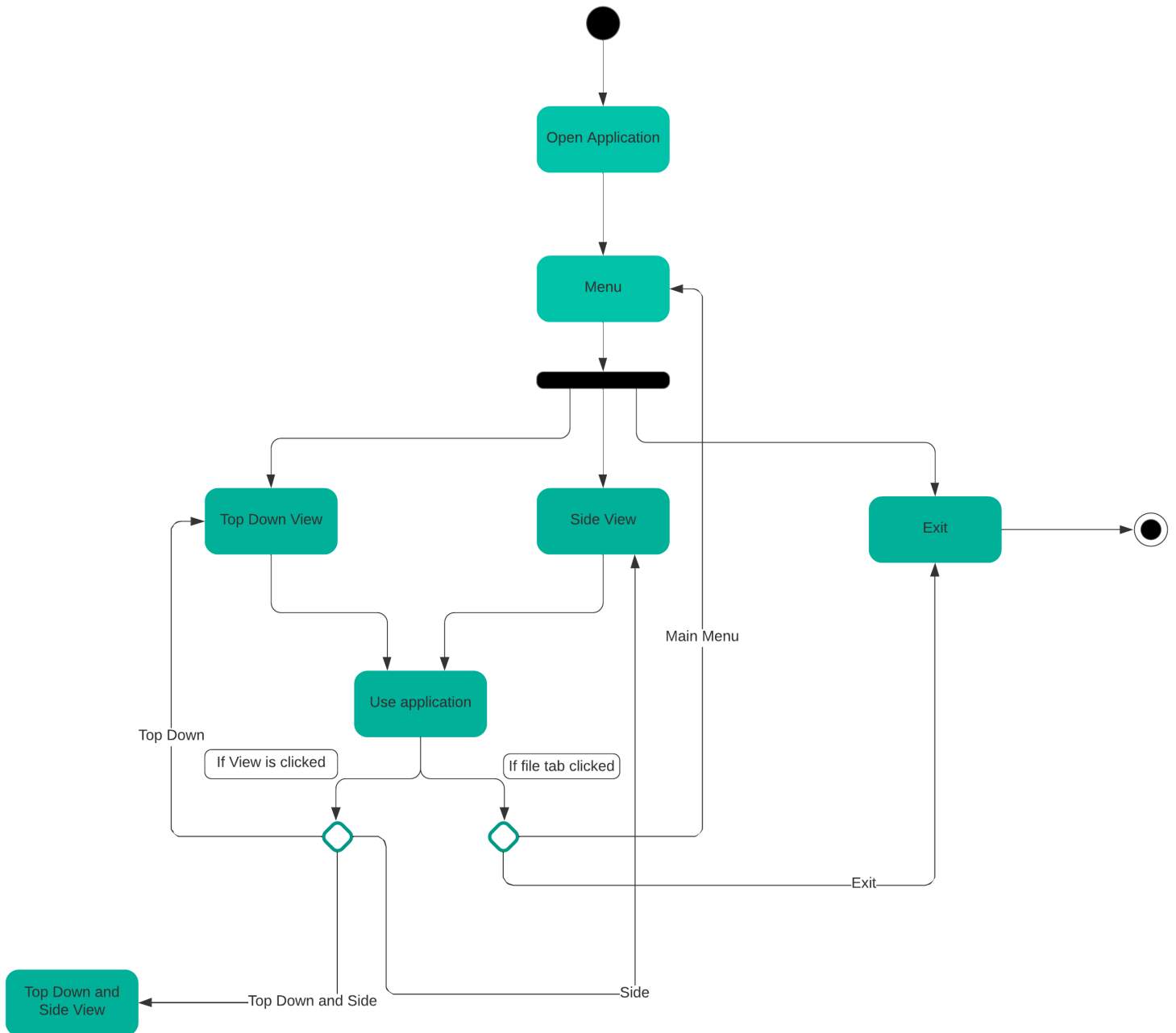
The backlog section displays our progress in the first sprint, while the second sprint backlog displays not only the tasks originally meant for the second increment, but also the tasks we failed to complete in this sprint, as we deemed that all of these can/should be done in the next sprint.
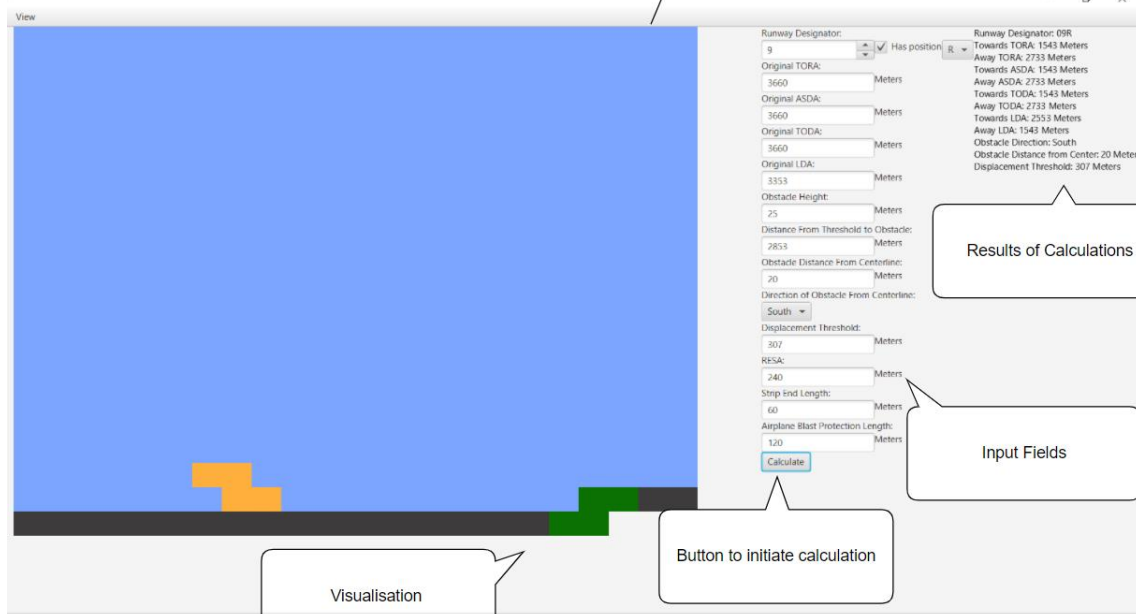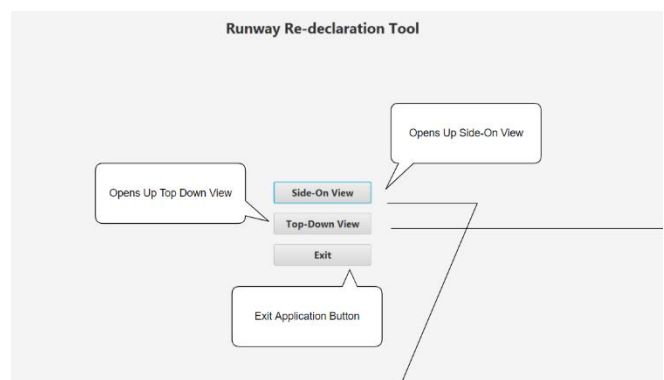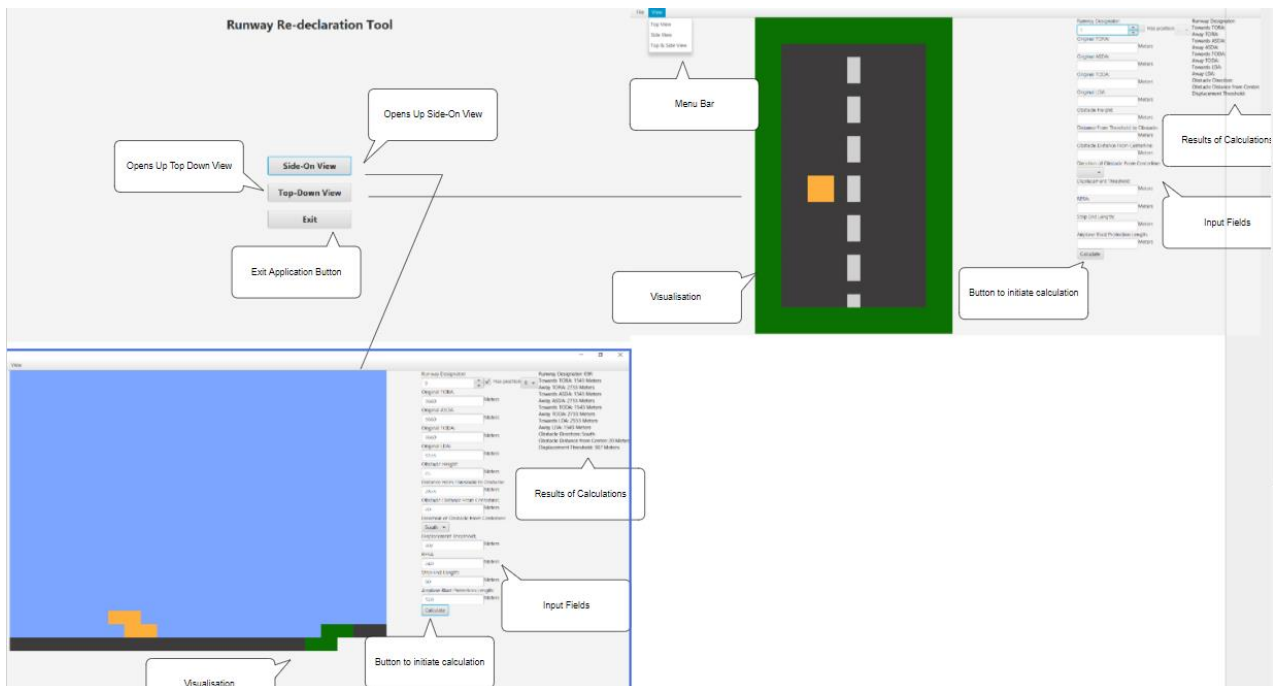
UML

1. Class Diagram:

Obstacle

-obsMatrix:Integer[][][]
-coord:Point3D

+Obstacle(x:Integer,y:Integer,z:Integer)
+setCubeObstacle(size:Integer):void
+setObstacle(height:Integer,length:Integer,width:Integer)
+getObstacleMatrix():Integer[][][]
+getPoint3d():Point3D

Point3D

-x:Integer
-y:Integer
-z:Integer

+Point3D(x:Integer,y:Integer,z:Integer)
+setX(x:Integer):void
+setY(y:Integer):void
+setZ(z:Integer):void
+getX():Integer
+getY():Integer
+getZ():Integer

Canvas

-imgSz:Integer
-tileMap3D:Integer[][][]
-tileMapSideView:Integer[][]
-tileMapTopDownView:Integer[][]
-obstacleList:ArrayList<Obstacle>
-runway:Runway

+Canvas(runway:Runway,imgSz:Integer)
+renderView(title:String):TilePane
+generateTileMapSideView():void
+generateTileMapTopDownView():void
+addObstacleToTileMap3D(obs:Obstacle):void
+removeObstacle(obs:Obstacle):void
+addListOfObstaclesToTileMap3D(obsLst:ArrayList<Obstacle>):void
+removeListOfObstacle(obsLst:ArrayList<Obstacle>):void
+moveObstacle(obs:Obstacle,newCoord:Point3D):void
+printTopDownView():void
+printSideView():void
+getTileMap3D():Integer[][][]
+getTileMapSideView():Integer[][]
+getTileMapTopDownView():Integer[][]

Runway

-length:Integer
-width:Integer
-height:Integer

+Runway(length:Integer,width:Integer,height:Integer)
+getLength():Integer
+getWidth():Integer
+getHeight():Integer
+setHeight(height:Integer):void
+setWidth(width:Integer):void
+setLength(length:Integer):void

BaseScene

#controller:SceneController
#scene:Scene
#root:BorderPane
#runwayPane:StackPane
#io:VBox
#inputs:CalculationInput
#toolbar:MenuBar

+BaseScene(controller:SceneController)
#setupDefaultScene(): void
+setScene(): Scene
+getScene(): Scene
#setStylesheet(filename:String):

Padding

+paddingLend:Integer
+paddingLstart:Integer
+paddingWleft:Integer
+paddingWright:Integer

+addLendPadding(tileMap3D:Integer[][][],paddLength:Integer):Integer[][][]
+addWleftPadding(tileMap3D:Integer[][][],paddLength:Integer):Integer[][][]
+addWrightPadding(tileMap3D:Integer[][][],paddLength:Integer):Integer[][][]
addPadding(tileMap3D:Integer[][][]):Integer[][][]

CalculationOutput

-cal:Calculations
-runwayName:Text
-towardsTORA:Text
-newAwayTORA:Text
-newTowardsASDA:Text
-newAwayASDA:Text
-newTowardsTODA:Text
-newAwayTODA:Text
-newTowardsLDA:Text
-newAwayLDA:Text
-obstacleDirection:Text
-obstacleDistanceFromCenter:Text
-displacementThreshold:Text

+CalculationOutput()
+updateValues(cal:Calculations):void

MenuScene

+MenuScene(controller:SceneController)
+build():void
-openSideScene(actionEvent: ActionEvent):void
-openTopScene(actionEvent: ActionEvent):void
-openDoubleScene(actionEvent: ActionEvent):void
-exit(actionEvent: ActionEvent):void

SideScene

+SideScene (controller:SceneController)
+build():void

TopScene

+TopScene (controller:SceneController)
+build():void

CalculationInput

+cal:Calculations

+CalculationInput()

Calculations

+newTowardsTORA:int
+newTowardsASDA:int
+newTowardsTODA:int
+newTowardsLDA:int
+newAwayTORA:int
+newAwayASDA:int
+newAwayTODA:int
+newAwayLDA:int
+runwayName:String

+Calculations(name:String,tora:String,asda:String,toda:String,lda:String,
height: String,distance:String,direction:String,obstacleDistance:String,
displacement:String,resa:String,stripEnd:String,blastProtection:String)
+takeOffTowardsLandingTowards():void
+takeOffAwayLandingOver(stopway:int,clearway:int):void

SceneController

-reshH:int
-reshV:int
-stage:Stage
-title:String
-currentScene:BaseScene
-scene:Scene

+SceneController(stage:Stage,reshH:int,reshV:int,title:String)
-createStage():void
-loadScene(newScene:BaseScene):void
+openMenuScene():void
+openSideScene():void
+openTopScene():void
+openDoubleScene():void
+getScene():Scene
+getWidth():int
+getHeight():int

IntegerField

+IntegerField()

RunwayDesignatorInput

+RunwayDesignatorInput()
+getText():String

2. Activity Diagram:

Storyboards

Storyboard 1 (top)

Runway Re-declaration Tool

- Opens Up Side-On View
- Opens Up Top Down View — Side-On View
- Top-Down View
- Exit
- Exit Application Button
- Menu Bar
- Visualisation
- Button to initiate calculation
- Results of Calculations
- Input Fields

Storyboard 2 (side-on view)

View

- Runway Designator
- Original TORA
- Original ASDA
- Original TODA
- Original LDA
- Obstacl Height
- Distance from Threshold to Obstacle
- Obstacl Distance from Centerline
- Direction of Obstacle from Centerline: South
- Displacement threshold
- RESA
- Strip End Length
- Airplane Blast Protection Length
- Calculate

Has position

Runway Designator: 09R
Towards TORA: 1543 Meters
Away TORA: 2733 Meters
Towards ASDA: 1543 Meters
Away ASDA: 2733 Meters
Towards TODA: 1543 Meters
Away TODA: 2733 Meters
Towards LDA: 2553 Meters
Away LDA: 1543 Meters
Obstacle Direction: South
Obstacle Distance from Center: 20 Meters
Displacement Threshold: 307 Meters

- Results of Calculations
- Input Fields
- Button to initiate calculation
- Visualisation

Storyboard 3 (top-down view)

View

Menu Bar
- Top View
- Side View
- Top & Side View

- Runway Designator
- Original TORA
- Original ASDA
- Original TODA
- Original LDA
- Obstacle Height
- Distance from Threshold to Obstacle
- Obstacle Distance from Centerline
- Direction of Obstacle From Centerline
- Displacement Threshold
- RESA
- Strip End Length
- Airplane Blast Protection Length
- Calculate

Has position

Runway Designator:
Towards TORA:
Away TORA:
Towards ASDA:
Away ASDA:
Towards TODA:
Away TODA:
Towards LDA:
Away LDA:
Obstacle Direction:
Obstacle Distance from Center:
Displacement Threshold:

- Results of Calculations
- Input Fields
- Button to initiate calculation
- Visualisation

Storyboard 4 (menu)

Runway Re-declaration Tool

- Opens Up Side-On View
- Opens Up Top Down View — Side-On View
- Top-Down View
- Exit
- Exit Application Button

Storyboard 5 (bottom, detailed)

View

Runway Designator:
9   Has position   R

Original TORA:
3660   Meters

Original ASDA:
3660   Meters

Original TODA:
3660   Meters

Original LDA:
3353   Meters

Obstacle Height:
25   Meters

Distance From Threshold to Obstacle:
2853   Meters

Obstacle Distance From Centerline:
20   Meters

Direction of Obstacle From Centerline:
South

Displacement Threshold:
307   Meters

RESA:
240   Meters

Strip End Length:
60   Meters

Airplane Blast Protection Length:
120   Meters

Calculate

Runway Designator: 09R
Towards TORA: 1543 Meters
Away TORA: 2733 Meters
Towards ASDA: 1543 Meters
Away ASDA: 2733 Meters
Towards TODA: 1543 Meters
Away TODA: 2733 Meters
Towards LDA: 2553 Meters
Away LDA: 1543 Meters
Obstacle Direction: South
Obstacle Distance from Center: 20 Meters
Displacement Threshold: 307 Meters

- Results of Calculations
- Input Fields
- Button to initiate calculation
- Visualisation

Scenarios

1. Jaden - aerodrome controller
   - Jaden opens the runway redeclaration app
   - The home page is displayed
   - Jaden can select between seeing the top-down, the side view or exiting
   - Jaden chooses the top-down view
   - A top-down view page is displayed
   - Jaden enters the values of a runway with an obstacle
     - He accidently enters the value of LDA to be larger than the TORA
     - After pressing the Calculate button alert pops saying "LDA cannot exceed TORA"
     - He reenters the correct value
     - He presses the Calculate button
   - Jaden sees exact top-down visualization of the runway
   - Jaden clicks "View" at the toolbar and then clicks "SIde View"
   - A side view page is displayed
   - Jaden once again enters the same correct values
   - A side view of the runway is visualized

2. Jane - approach controller
   - Jane opens the runway redeclaration app
   - The home page is displayed
   - Jane can select between seeing the top-down, the side view or exiting
   - Jane chooses the side view
   - A side view page is displayed
   - Jane enters the values of a runway with an obstacle
     - She accidently enters the value of TODA to be larger than the TORA
     - After pressing the Calculate button alert pops saying "TODA cannot exceed TORA"
     - She reenters the correct value
     - She presses the Calculate button
   - Jane sees how much of the runway is usable

3. Gemma - independant calculator
   - Gemma opens the runway redeclaration app
   - The home page is displayed
   - Gemma can select between seeing the top-down, the side view or exiting
   - Gemma chooses the side view
   - A side view page is displayed
   - Gemma enters the values of a runway with an obstacle
     - She presses the Calculate button
   - Gemma checks all the newly displayed values
   - Gemma clicks "File" at the toolbar and then exit
   - The application closes

Logbook

Feedback after the envisioning:

Regarding personas, the feedback we received was that, although facilitating stakeholders were not required in the specification, we should have given it some thought, which we did not. After discussing, we concluded that the facilitating stakeholders would be us, the programmers, as well as any future programmers or IT employees who would be responsible for the upkeep or further development of the code. We were also told that we should have had more primary stakeholders, as we only had one. In our envisioning, we believed that only the primary user should be the primary stakeholder, but, considering that a large part of the project is the visualization, and the air traffic control were the primary users that requested that functionality, we should have put them as primary stakeholders. Our plan for the coursework took into consideration the requests of both primary and secondary stakeholders, so making that change luckily won't impact our plan for the coursework significantly.

In terms of the burndown chart, the feedback we received was that the meaning of the different colours used should have been indicated not just in the backlogs, but also in the burndown charts. This will be fixed in the next burndown chart.

With regards to the risk analysis, we were told that we probably underestimated both the severity and likelihood of risks, and that it would probably be better to overestimate, than underestimate these risks. This issue also influenced our backlogs, as we only considered the actual difficulty of completing the tasks when deciding it's difficulty, whereas we should have also taken into consideration the risks, and how that would impact the amount of time spent on each task. This will be taken into consideration in any new tasks that will be included in future sprint backlogs. We were also told of a serious omission in terms of risk. We have not considered the fact that some functionalities, which were previously completed, may stop working due to bugs during the development. However, after consideration, we believe that (unintentionally) we covered this case under "Product develops hard to solve bugs that will take extra time/effort to debug"

Another feedback that we received was that our report should include a high level description of what we wish to achieve in the following sprint as an introduction. We will include this in our next report.

We were also instructed to add an additional row to our sprint backlog, which would highlight the total difficulty of the sprint, summing up the difficulty of each individual task. We have added these to both sprint backlogs.

In terms of our sprint backlogs, as previously mentioned, we were told that we underestimated the difficulty of the tasks, and not broken tasks down enough, into small digestible chunks. One suggestion that we received was to sit down ahead of each sprint in a meeting, and look through all the tasks and break them down ahead of time. This would help us better estimate the difficulty of each task as well.

Informal Review:

A few days before our submission, we asked our supervisor to give us some informal feedback. The main points of the feedback were as follows:

The button names are quite strange: "TopScene" and "SideScene". He recommended naming them something that contains less jargon. He also recommended that we remove the "DoubleScene" button, as this functionality is not implemented, and therefore, it should not be there.

We were also advised to use the scenarios which were still in progress to provide a sort of test for the UI part as we mentioned, that we were not sure how to test that.

Our display while present was not yet functional, as we were only planning to lay out the groundwork for the next sprint, where we would actually implement the functionality. Our supervisor drew our attention to the fact that we need to deliver value to the customer, and therefore, we should add at least some functionalities to the display. While this was hard to hear feedback, as the functionality of the display was not even started, we decided to heed his advice, and added the functionality, to move the object on the visualization, depending on it's distance from the start of the ruway.

Backlogs

1. First Sprint

Task ID	Name	Description	Workforce	Estimated Difficulty	Actual Difficulty	Date Of Finish
0	Descriptions	Short Description of the Task	People undertaking the task	In units (1 unit ≈ 30 mins)	How long it actually took	Date on which task was finished
1	Individual display	Side-on and Top-Down visualisations can be displayed individually	Adam, Andrew	4	3	02.03.2022
3	Centerline	Runway & centerline displayed on top-down view	Guillame	4	12	04.03.2022
4	TORA	Runway strip displayed in both views and TORA indicated		6		
5	Clearway and TODA	Clearway and new TODA displayed on both views		4		
6	Stopway and ASDA	Stopway and new ASDA displayed on both views		4		
8	LDA	LDA calculated and displayed on both views		4		
12	Displaced threshold	Displaced threshold calculated and displayed on both views		6		
13	Obstacle display	Obstacles displayed on both views		6		
15	Calculations	Code calculates new runway length given 1 obstacle and parameters	Patrik, David	6	6	07.03.2022
17	Calculation Display	Calculation results displayed side-by side with original values	Adam	6	4	07.03.2022
90	Visualisation Skeleton	Visualtisation Component created and working	Guillame	6	4	03.03.2022
91	Calculation Component	Calculation Component functional	Patrik, David	6	4	04.03.2022
92	Skeleton application	Implement basic navigation (windows, scenes)	Adam, Andrew	4	8	02.03.2022
93	Tests	Write tests for current code	David	1		08.03.2022
94	Scenarios	Write scenario for the tasks	David	6	3	08.03.2022
95	Storyboards	Create storyboard	Patrik	6	2	08.03.2022
96	UML	Class, and 2 additional UML diagrams made	Madhav	6	8	08.03.2022
97	Logbook	Write the logbook for the first sprint	Patrik	4	3	07.03.2022
98	Sprint Planning	Create/Update sprint backlogs and burndown charts	Patrik,Madhav	3	3	08.03.2022
99	Report	Write the report for the current increment	Patrik	3	3	09.03.2022
100	Overall difficulty	Overall difficulty of current sprint		95	63	
MoSCoW Prioritisation for the Sprint:		Must	Should	Could	Won't	

2. Second Sprint

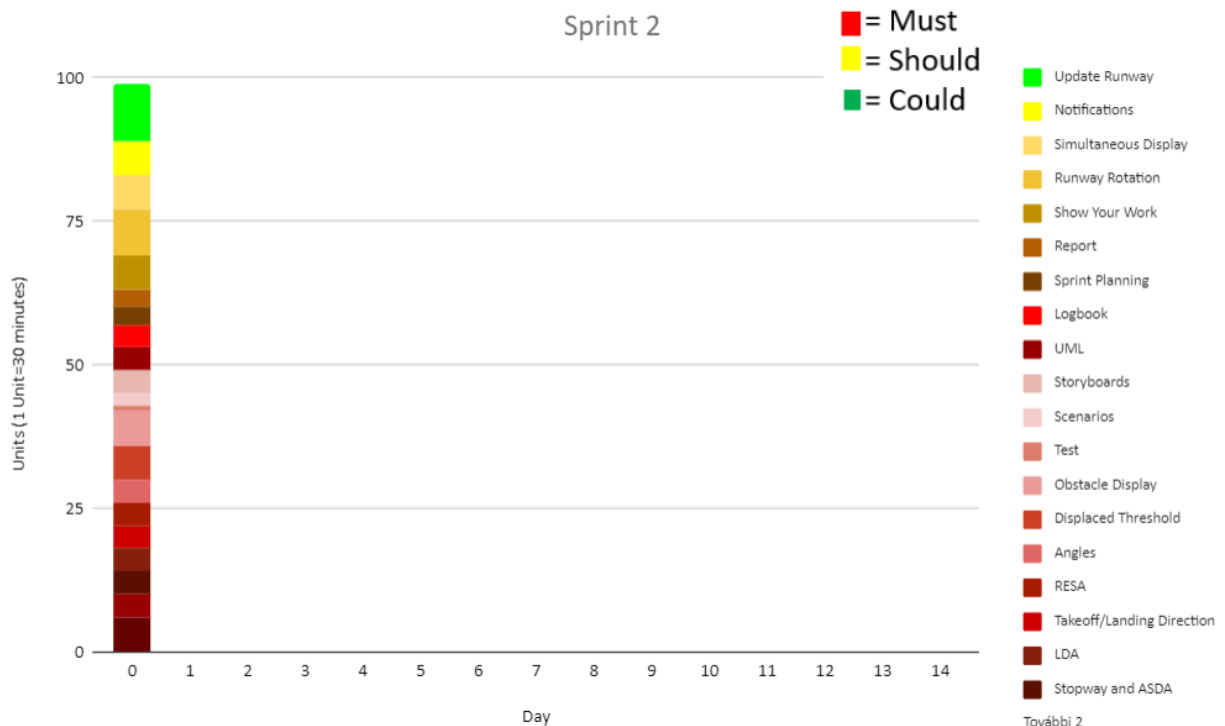| Task ID	Name	Description	Workforce	Estimated Difficulty	Actual Difficulty	Date Of Finish
0	Descriptions	Short Description of the Task	People undertaking the task	In units (1 unit ≈ 30 mins)	How long it actually took	Date on which task was finished
2	Simultaneous display	Side-on and Top-Down visualisations can be displayed simultaneously		6		
4	TORA	Runway strip displayed in both views and TORA indicated		6		
5	Clearway and TODA	Clearway and new TODA displayed on both views		4		
6	Stopway and ASDA	Stopway and new ASDA displayed on both views		4		
8	LDA	LDA calculated and displayed on both views		4		
9	Takeoff/Landing Direction	Takeoff and landing directions are displayed on both views		4		
10	RESA	RESA displayed on both views (if needed)		4		
11	Angles	Offsets caused to ALS and TOCS calculated and displayed on side-view		4		
12	Displaced threshold	Displaced threshold calculated and displayed on both views		6		
13	Obstacle display	Obstacles displayed on both views		6		
18	Show Your Work	Calculation steps displayed on request		6		
20	Runway Rotation	Automatically rotate runway so it matches compass direction		8		
21	Update Runway	Views update in real time if new runway, obstacle, data selected or changed		10		
22	Notifications	Notifications must be given to user whenever data changes		6		
93	Tests	Write tests for current code		1		
94	Scenarios	Update scenario for each persona		2		
95	Storyboards	Update storyboard		4		
96	UML	Update UML diagrams		4		
97	Logbook	Write the logbook for the sprint		4		
98	Sprint Planning	Create/Update sprint backlogs and burndown charts		3		
99	Report	Write the report for the current increment		3		
100	Overall difficulty	Overall difficulty of current sprint		99		
MoSCoW Prioritisation for the Sprint:		Must	Should	Could	Won't	

Burndown Charts

1. First Sprint

2. Second Sprint