**Pipeline in a flow network**

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# Executive summary

We are writing this report to summarize our progress in “Pipeline in a network” project. This project was requested by Fontys school of Applied sciences. Mr. Sanchez was our coach and mentor for this project beginning from the planning until the implementation phase. We tried our best to fulfilling all the requirements that were laid out in this projects requirements. We have successfully created an application that simulates a flow network that consists of pipelines and components and simulates.

Furthermore, we will describe short introduction of the project. We will discuss our understanding with coach. We will narrate at which certain moment we faced difficulty. We will talk about individual effort by each group member.

Finally in this report, you can find every group member’s personal point of view for project project and experiences on working together as a team on this project.

# Introduction

This application allows the user to make a drawing sketch of a network for a fuel transportation system. It helps the user to simulate a network containing components, including pump, sink, splitter, adjustable splitter and merger.

Together the components and their associated pipelines would allow the user to create a simulation for a network for the transportation of fuel. The application will help users connect and manage the amount of fuel of every pipeline. The application will give constant feedback on the flow of the system for each pipeline, including checks on occurrences of overflow.

# Understandings with the Coach

# During all meetings, Mr. Sanchez helped us a lot in making our solution as best as it could be. He always tried to enhance our confidence and was available to address all of our concerns. His suggestions were always taken into consideration during the course of this project.

# Team work

For good progress of project good teamwork matters a lot .Our group members contributed a lot for successful completion of the project. Everyone cooperated with each other whether it be contributing in team meetings or working individually on their parts.

# Division of labor

The assignment was divided into 4 sub parts: User Requirements Specification document, Design document, final implementation and process report .We divided the whole work within group members.

Here below you can see major activities of our project performed by each group member.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Major Tasks** | **Armin** | **Bilal** | **Raima** | **Thanh** |
| **Introduction** |  |  |  |  |
| **Functional requirements** |  |  |  |  |
| **Non-Functional requirements** |  |  |  |  |
| **Class diagram** |  |  |  |  |
| **Class description** |  |  |  |  |
| **Sequence diagrams** |  |  |  |  |
| **FileHandler class** |  |  |  |  |
| **Component Class(including child classes)** |  |  |  |  |
| **Network class** |  |  |  |  |
| **Pipeline class** |  |  |  |  |
| **PipelineSystem class** |  |  |  |  |
| **Form class** |  |  |  |  |
| **Progress report** |  |  |  |  |

# Important decisions

During the design stage for USR and design documents, we did make some following considerations and came up with final decision:

* Consider between two methods to add components:
  + First solution could be drag and drop component to draw them
  + Second solution could be click on the button represent for the component and click on the position which user want to place the component and this one will be drawn.
  + Decision: the second solution seem to be easier for user to use than drag and drop. With drag and drop, users have to hold the mouse while finding the position which they want to place the component.
* Delete component can be done in 2 methods:
  + Users can choose the component they want to delete and press delete to delete them.
  + Users can choose the delete button first and click on the component to delete them.
  + Decision: Base on the consistency of UID design concept, the second solution seem to be easier for user to follow that function. Since, all the components when they want to draw it, they have to click on the button representing for the components and place them. Applying the same instruction for deleting helps users feel more comfortable when they applied their mental model.
* Implementation of warning that deleting components will also remove all connected pipelines.
  + For consistency factor, it should be applied for remove pipelines as well. This leads to the problem of interrupting users during their working flow.
  + Another suggestion could be, users is allowed to remove any components immediately and the undo function will be offered.
  + Decision: We decided to display the warning messages for the remove pipeline as well to make sure that the factor of consistency in user interface design concept not being effected.
* Consider about the pipeline class should be a subclass of the component class. Final decision is that pipeline class has some special properties and it should be kept as a separate class.

# Implementation process:

## GITHUB REPOSITORY:

Github is used to share source code and for collaborative working purpose:

<https://github.com/thanhhnk/OOD/tree/master/OOD2>

To make sure that the projects is completed on time, some functionalities, for instance read and write the network object to the text files need to be done independently without the complete implementation of network class and form class. In this case, unit test is used for testing and debugging the FileHanlder class independently with others process.

## IMPLEMENTED FUNCTIONALITIES

* Add components to a flow network It is not allowed to have components overlapping each other.
* Pipelines are placed between components. A pipeline is between the output of a component and the input of another component and it has some in-between-points.
* Every input of a component can be connected with 0 or 1 pipeline. However, the merger can connect to at most two input components
* Every output of a component can be connected with 0 or 1 pipeline. However, the spliter can connect to at most two output components.
* It allows to remove components. When a component is removed, all pipelines connected to that component are removed too.
* It allows to remove pipelines.
* It allows to change the current flow of a pump and checks for current flow cannot exceed its capacity. In this functionality, users have to double click on the pump to change the values.
* It allows to change the percentage of fuel leaving by the upper output of an adjustable splitter. In this functionality, users have to double click on the pump to change the values.
* It allows to see the current flow through every pipeline. If the current flow of the pipeline exceeds the safety limit, the pipeline will be drawn in red colour.
* For every component, it allows to see how much fuel will be transported through it.
* It allows to save the network into a text file then open and reload it again.
* It allows to add a new network drawing and checking for the saving of the current network.

# Problems, we faced

The only major problem that we faced in the whole process was “time management”. Some group members had different schedules, so it was quite hard for us to arrange such time where everyone is free. Otherwise almost everything went surprisingly perfect.

# Personal views

**Armin:**

As an individual, working in this project has added some valuable points in my both personal and working personality. I have learned to write, analyzed and understand UML, use cases, diagrams such as sequence and class diagram and practice my knowledge which I have learned in previous courses. This project not only helped me to understand and learn these aspect, but also implementing what we have agreed and designed had great impact in my knowledge. I also learned some aspect of the group working such as commitment and communication skills.

**Bilal:**

During the course of this project we came across many challenges, and a lot of the time our implementation of the project turned out to be different than we had anticipated. However I feel that we were able to cope with all the challenges by discussing with each other all the different solutions with each other and coming up with the best solution we saw possible.

I believe the planning process in relation to especially composing the class diagrams helped give us a blueprint for how the project would be implemented later on. The time spent on planning and documentation, I think saved us a lot of time in the implementation stage. The implementation was not entirely as we had envisioned in our planning, but it was built on the planning framework that we had made for it. This project has been an immense learning experience and more than the technical knowledge I believe I have gained a better understanding of how to solve problems in synchronization with and input from my group members. Many ideas put together produce a better solution than individual ones.

**Thanh:**

Working with this project gave me a better understating about the design processes and how to indicate the requirements of the user in the best way by using UML diagrams. I also realized that there is a big gap between design phrases and implementation. During the implementation, I saw that there were many problems we forgot to consider during the design processes and many methods need to be added. Overall, I think if the design is done in a good way, the implementation process can be done in an effective way.

**Raima:**

This project proved really helpful for me.I gained a lot of knowledge in the field of documentation. And after this project I am convinced that documentation is key to successful implementation of the project.

# Conclusion

Overall, the team feels the project has been a success. A great deal of knowledge has been gained through the trails of this project, these lessons will be invaluable in future endeavors.