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User Requirements Specification Document for Pipelines

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Background and Context

To transport fuel from one place to another place pipelines are used. The system is becoming more complex over time therefore it becomes difficult to manage the flow of in the pipeline system. For safety purposes it is very important that the pressure in the pipes don't become to high. The following components are part of the flow system: pump, sink, splitter, adjustable splitter and merger.

Contents

1 | Functional Requirements

1.1 Requirements

1.1.1 General requirements

Code	Requirement
GEN–010	The program is compatible with Windows 7.
GEN–020	The system allows to design a flow system using the folowing components: • Pump • Sink • Splitter • Adjustable splitter • Merger
GEN–030	The system shows the flow through the pipelines.

1.1.2 System requirements

Code	Requirement
SYS–010	The system allows to add components to the flow network.
SYS–020	The components are not allowed to overlap each other.
SYS–030	The system allows to connect a pipeline between an unused output of a component to an unused input of a component.
SYS–040	The system allows to remove components including pipelines.
SYS–040A	All the pipelines connected to the removed component will also be removed.
SYS–050	The system allows to change the flow output of a pump within his range.
SYS–060	The system allows to change the distribution of the flow from splitter going to the top and bottom output.
SYS–070	The system displays the flow going through the pipelines.
SYS–070A	The system displays the pipeline red in case the flow exceeds the safety limit.
SYS–080	The system displays the flow transported to a sink.
SYS–090	The system allows to export the flow network to a file.
SYS–100	The system allows to import a flow network from a file.

1.2   Use cases

Use Case 1	Adding new component on flow network
Level:	User–goal
Primary Actor:	End–User
Preconditions:	Component selected

Main Success Scenario:
   1. User select place on flow network grid

   2. System places component on grid

2.a System can't place component in selected area

> 1. End-User is informed that component can't be placed
>
> 2. User returns to step 1

Use Case 2	**Creating connection between components**
Level:	User-goal
Primary Actor:	End-User
Preconditions:	Selected pipeline drawing tool

Main Success Scenario:
1. User selects starting component

2. User selects point on grid, through where pipeline will go

3. User selects ending component

4. Systems draws pipeline

Extensions:

1.a Selected component already has no unused output

> 1. End-User is informed that the selected component can't be used.
>
> 2. Select another component as starting point

2.a Selected point on grid is occupied by component

> 1. The selected point is ignored.

Use Case 3	Deleting element on flow network grid
Level:	User–goal
Primary Actor:	End–User
Preconditions:	Selected tool for removing component

Main Success Scenario:
1. User selects component on pipeline network grid
2. System removes selected component
3. System removes pipelines connected to component

Use Case 4	Changing current flow of a pump
Level:	User–goal
Primary Actor:	End–User
Preconditions:	Selected pump

Main Success Scenario:
1. User inputs new flow
2. System updates flow network grid.

Extensions:
1.a The new flow exceeds capacity

    1. End–User is informed that the selected component can't be used and the maximum flow possible is used

Use Case 5	Change output adjustable splitter
Level:	User–goal
Primary Actor:	End–User
Preconditions:	Selected adjustable splitter

Main Success Scenario:
1. User uses slider to adjust the output.

2. System updated the flow network grid.

Extensions:
1.a Component isn't adjustable splitter.

      1. The option to adjust the flow isn't shown.

Use Case 6	Current flow
Level:	User–goal
Primary Actor:	End–User
Preconditions:	Pipeline connection

Main Success Scenario:
1. System displays current flow in pipeline.

Use Case 7	Current flow
Level:	User–goal

Primary Actor:	System

Preconditions:	Pipelines are connected between components

Main Success Scenario:
1. System displays current flow in pipeline.

Extensions:
1.a An adjustable splitter has 1 output

   1. All the flow goes to 1 output.

Use Case 8	**Load file**

Level:	User–goal

Primary Actor:	End–User

Preconditions:	Saved file with pipeline network

Main Success Scenario:
1. User selects file to open.

2. System loads the file.

Extensions:
2.a File can't be loaded.

   1. User is informed that file can't be loaded and given the choice to stop or choose another file.

2 | User Interface

TODO

3 | Nonfunctional Requirements

Code	Requirement
NON–010	The program has an user friendly design
NON–020	The software is made testable.