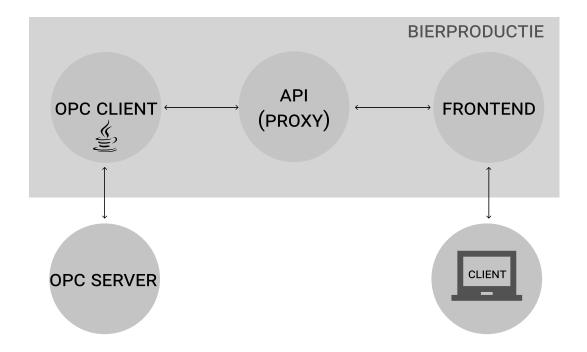
Bierproductie

A management system for brewing machines



Bachelor of Engineering, Software Technology Semesterproject 3. semester, ST3-PRO

Project Period: 31.08.2020 - 19.12.2020

Hand in date: 19.12.2020

Group 06:

Jakob Rasmussen, jakra19@student.sdu.dk Kenneth M. Christiansen kechr19@student.sdu.dk Kevin K. M. Petersen, kepet19@student.sdu.dk Kristian N. Jakobsen, kjako19@student.sdu.dk Simon Jørgensen, sijo819@student.sdu.dk

Supervisor: Parisa Niloofar, parni@mmmi.sdu.dk

University of Southern Denmark
The Faculty of Engineering
The Mærsk Mc-Kinney Møller Institute
Campusvej 55, 5230 Odense M

Title: Bierproductie

Institution: University of Southern Denmark

The Faculty of Engineering, The Mærsk Mc-Kinney Møller Institute

Campusvej 55, 5230 Odense M

Education: Bachelor of Engineering, Software Technology

Semester: 3. Semester

Course Title: Industrial 4.0 cyber-physical software systems

Internal Course Code: ST3-PRO

Project Period: 31.08.2020 - 19.12.2020

ECTS: 10 ECTS

Supervisor: Parisa Niloofar

Project group: 06

Kakob Rasmussen, jakra19@student.sdu.dk

Menneth Munh

Kenneth M. Christiansen, kechr19@student.sdu.dk

Kevin K. M. Petersen, kepet19@student.sdu.dk

Kristian W. Jakobsen, kjako19@student.sdu.dk

Simon

Simon Jørgensen, sijo819@student.sdu.dk

Pages: 10 Appendix: 0

By signing this document, each group member confirms that everyone have participated equally to this project, and everyone is thus collectively responsible for the content of the report.

I Summary

II Table of Contents

III Editorial

IV List of Figures

1 Introduction

2 Background

3 Problem analysis

4 Theory & Methods

5 Requirements

- 5.1 Overall Requirements Specification
- 5.2 Selected Detailed Requirements
- 5.2.1 Functional & Non-Functional Requirements
- 5.2.2 The Physical Setup (The Brewery Machine)
- 5.2.3 The Simulator
- 5.3 Use Cases
- 5.3.1 Actor List
- 5.3.2 Detailed Use Cases

From project description

5.3.3 Use Case Diagram

6 Analysis

- 6.1 Use Case analysis
- 6.1.1 Class Candidates
- 6.1.2 Description of Classes
- 6.1.3 UML Analysis Diagram
- 6.2 Use Case Realisation
- 6.2.1 Sequence Diagrams
- 6.2.2 Operation Contracts

An operation contract describes the responsibility of the operation. The contract focuses on what the operation can change, and not how it is changed. It is also used to describes the state of the system before and after the operation is called.

start		
System operation	start	
Cross References	Use case: Start machine see table ??	
Responsibility	Starting the beer machine if the pre-conditions is met. If the pre-	
	conditions is not met, the beer machine will not start	
Output	The beer machine started the production	
Pre-conditions	The beer production machine needs to be in ready mode, that is,	
	not producing beer.	
Post-conditions	The beer machine started brewing	

Table 1: Operation Contracts start

$\operatorname{stopProduction}$		
System operation	stopProduction	
Cross References	Use case: Stop the beer Machine see table ??	
Responsibility	Stop's the beer machine if the pre-conditions is met. If the pre-	
	conditions is not met, the beer machine will not do anything	
Output	The beer machine is stopped	
Pre-conditions	The beer machine needs to be running	
Post-conditions	The beer machine is stopped	

 Table 2: Operation Contracts stopProduction

reset		
System operation	reset	
Cross References	Use case: reset see table ??	
Responsibility	It is responsible for resetting the beer machine.	
Output	reset the beer machine.	
Pre-conditions	The beer production machine needs to be in ready mode, that is,	
	not producing beer.	
Post-conditions	The beer production machine has been reset.	

Table 3: Operation Contracts reset

clear		
System operation	clear	
Cross References	Use case: clear see table ??	
Responsibility	It is responsible for clearing the beer machine.	
Output	The beer machine has been cleared.	
Pre-conditions	The beer production machine needs to be in ready mode, that is,	
	not producing beer.	
Post-conditions	The beer production machine has been cleared.	

Table 4: Operation Contracts clear

display live data		
System operation	displayLiveData	
Cross References	Use case: displayLiveData see table ??	
Responsibility	It is responsible for posting data to the client.	
Output	Post data to the client.	
Pre-conditions	The beer production machine needs to be on and producing beer.	
Post-conditions	Live data has been displayed for the user.	

 ${\bf Table~5:~Operation~Contracts~monitor And Display Data}$

${f batch Report}$		
System operation	batchReport	
Cross References	Use case: batchReport see table ??	
Responsibility	Make a report after the pre-conditions is met and adds the report	
	to the database.	
Output	Produces a batch report and display it for the user.	
Pre-conditions	The beer Machine needs to have produced a batch.	
Post-conditions	A batch report has been displayed for the user.	

Table 6: Operation Contracts produceBatchReport

${\bf 6.2.3}\quad {\bf Updated}\ {\bf UML}\ {\bf Class}\ {\bf Diagram}$

7 Architecture

8 Design

9 Implementation

10 Verification & Validation

11 Evaluation

12 conclusion