IN4387 System Validation

Design & Verification of Controller for a Package Storage System

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Contents

Chapter 1

EXAMPLES

1.1 A section

You can see a random figure in Figure 1.1.

A list:

- An item
- And another one

Figure 1.1: This is the google logo

An example of a table is given in table 1.1. See the literature list at the end of the report somewhere.

left aligned column	centred column
next row	random content

Table 1.1: This table contains stuff

This is an example of a reference [**?**].

And here a new example: pseudocode 1!

1.2 Another section

You should read all the stuff in section 1.1. This section holds only an example of a reference ;)

Algorithm 1 DepthFirstSearch

Require: A graph $G = (V, E)$ in adjacency list presentation, starting vertex v, an empty stack S

Ensure: All vertices in this connected component labelled

```
1: label v
2: push all neighbours of v on S
3: while S not empty do
4:     w ← pop S
5:     label w
6:     for u in adjacency list w do
7:         if u not labelled then
8:             push u onto S
```

Chapter 2

Introduction

Chapter 3

Global requirements

Global Requirements

In the section, we describe the global requirements to required initially for the design of the controller:

1. Each elevator, rack and conveyor belt contains at most one packet.
2. Packet is exchanged only when the elevator platform is at the same level as that of a conveyor belt.
3. Packet is exchanged only when elevator platform is at the same level as that of a rack.
4. The two elevators cannot be at the same position.
5. The lower elevator must never pass the upper one.
6. Packets are always delivered in the same order as requested.
7. If a packet is ready to enter and there is a free position at the rack(s), it will be eventually accepted.
8. If a requested packet is in the system, it will be eventually delivered.
9. If a packet is unable to be located, a unique alarm must be generated.
10. The number of packets in the system can at most be equal to the number of racks.

Chapter 4

External interactions

This section lists the external interactions for the packet storage system. These are the high actions that are essential for the design of the system. The table 4.1 lists the interactions in the system, with first column denoting the name of the action, second column lists its description and the third column lists the parameters essential for that action. The internal actions within the system are described in a later section.

Note: The parameters for the actions can be shared, which means that they are part of two different actions which need to be synchronized.

Table **??** is a reference list of the final components that were used.

Action	Description	Parameter
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
DoIt	—	Param1
TOTAL PRICE	-	356

Table 4.1: External interactions: Packet storage system

Chapter 5

Translated requirements

This section lists the requirements from section 3 in terms of interactions described in section 4.

1. *Each elevator, rack and conveyor belt contains at most one packet*
    - There is a packet on the conveyor belt, so no packet is allowed to enter.
    - There is no packet on the conveyor belt, so no packet is allowed to leave.
    - There is a packet on the elevator, so no packet is allowed to be loaded.
    - There is no packet on the elevator, so no packet is allowed to be unloaded.
    - There is a packet on the rack, so no packet is allowed to be stored.
    - There is no packet on the rack, so no packet is allowed to leave.
2. *Packet is exchanged only when the elevator platform is at the same level as that of a conveyor belt*
    - If elevator platform is not on the same level of input conveyor belt, no packet is loaded onto the elevator.
    - If elevator platform is not the same level as the output conveyor belt, no packet is loaded onto the conveyor belt.
3. *Packet is exchanged only when elevator platform is at the same level as that of a rack*
    - If position of rack and elevator platform are different, no packet is stored onto the rack.
    - If position of rack and elevator platform are different, no packet is loaded onto the elevator platform from the rack.
4. *The two elevators cannot be at the same position*
    - It cannot happen that two elevators are at the same position.
5. *The lower elevator must never pass the upper one*
    - The lower elevator is always below the upper elevator.
    - The lower elevator cannot go to the highest position.
    - The upper elevator cannot go to the lowest position.

6. *Packets are always delivered in the same order as requested*
    - It is not possible to receive packet(s) in an order different than as requested.
7. *If a packet is ready to enter and there is a free position at the rack(s), it will be eventually accepted*
    - If there is no free position in racks, packet must not be accepted.
    - If there is a free position in the racks and the packet is ready to enter, it must be eventually stored.
8. *If a requested packet is in the system, it will be eventually delivered*
    - If a packet is requested and it is in the system, it must be delivered eventually.
    - If a packet is requested and it is not in the system, no packet is delivered.
9. *If a packet is unable to be located, a unique alarm must be generated*
    - If the requested packet is not located in the racks, system is informed with an alarm.
10. *The number of packets in the system can at most be equal to the number of racks*
    - The number packets in the racks cannot be greater than the number of racks in the system.

Chapter 6

Architecture

Chapter 7

Modelling the controller

Chapter 8

Verification

Chapter 9

Experimental results

Chapter 10

Conclusions and recommendations

Bibliography

Appendix A

Source Code Structure