

Software Requirement Analysis for AAA System

Project Team
Team 4

Date
2015-09-16

Team Information

임준혁 : 201112395
박형준 : 201111358
Mikkel : 201560552
Thomas : 201560671

Table of Contents

- [1 Introduction](#)
- [1.1 Purpose](#)
- [1.2 Scope](#)
- [1.3 Definition, acronyms, and abbreviations](#)
- [1.4 Reference](#)
- [1.5 Overview](#)
- [2 Overall Description](#)
- [2.1 Product Perspective](#)
- [2.2 Product functions](#)
- [2.3 User characteristics](#)
- [2.4 Constraints](#)
- [3 Structured Analysis](#)
- [3.1 System Context Diagram](#)
- [3.1.1 Basic System Context Diagram](#)
- [3.1.2 Event List](#)
- [3.1.3 The System Context Diagram](#)
- [3.2 Data Flow Diagram](#)
- [3.2.1 DFD level 0](#)
- [3.2.1.1 DFD](#)
- [3.2.1.2 Process Specification](#)
- [3.2.1.2.1 Process 1](#)
- [3.2.1.2.2 ...](#)
- [3.2.1.2.3 Process #](#)
- [3.2.1.3 Data Dictionary](#)
- [3.2.2 DFD Level #](#)
- [3.2.2.1 DFD](#)
- [3.2.2.2 Process Specification](#)
- [3.2.2.2.1 Process #.1](#)
- [3.2.2.2.2 ...](#)

[3.2.2.2.3](#) [Process #.#](#)

[3.2.2.3](#) [Data Dictionary](#)

[3.2.2.4](#) [State Transition Diagram \(*Name of Controller*\)](#)

[3.2.3](#) [Overall DFD](#)

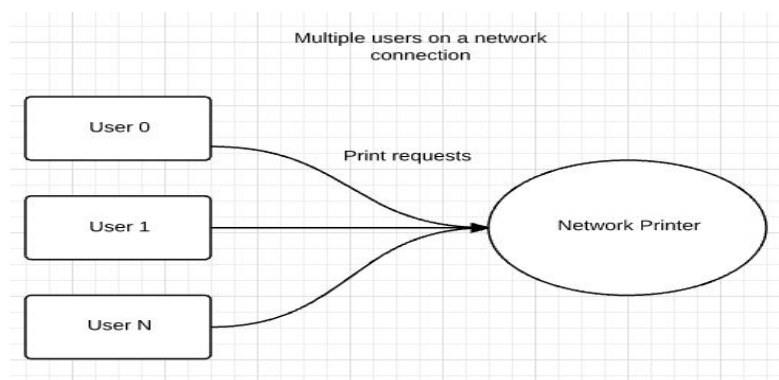
1 Introduction

1.1 Purpose

The purpose is to make a printer available to multiple users. The users are granted print authority by the Administrator, and can send print request to the printer. The printer provides the user with ink and paper status and will deliver a print result as long as certain requirements are met. Furthermore, simultaneous print request from multiple users are prioritised in chronological order to ensure efficient and logically functional printer.

1.2 Scope

A network printer is shared by multiple users.



The purpose of this class is to make a network printer system like the one above on a virtual environment. The printer must send data of its current state to the user, receive print data from multiple users and return a result by saving the return value in a print result file. All system must be in a SW format. The functions that need a HW are to be made virtually from SW modules.

1.3 Definition, acronyms, and abbreviations

PR-Print Request

SW-Software

RTS - request to send

1.4 Reference

Software Engineering 9th edition by Sommerville

2 Overall Description

2.1 Product Perspective

A virtual printer network system developed on C.

2.2 Product functions

The printer prints “.txt” files.

The printer can receive data from multiple users and return a printed result

The printer can show a preview of the printed data to the user

The printer can be stopped in the middle of printing

If the printer receives multiple requests in a short period of time, it prioritizes the requests in a chronological order

The printer displays the remaining amount of ink and paper to the user

The printer cannot print under certain circumstances

The printer consumes ink and paper proportionally to the amount of words printed

The ink and paper is refilled by the Admin

The Admin can add and delete user accounts

The Admin can see the user accounts granted access to the printer

2.3 User characteristics

User accounts can be created by the admin. They can also be deleted by the admin.

A single user account can send multiple print requests, and multiple users can send requests at the same time.

The user is given information of ink and paper amount upon request(or after sending a print request)

The user cannot send files that does not exist and the files must be in .txt format in order for the printer to print

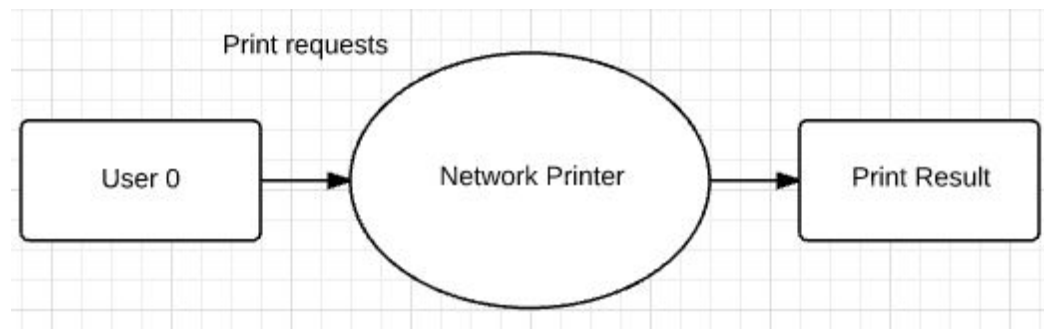
2.4 Constraints

All commands are executed through Cygwin and users cannot send nonexistent files.

3 Structured Analysis

3.1 System Context Diagram

3.1.1 Basic System Context Diagram



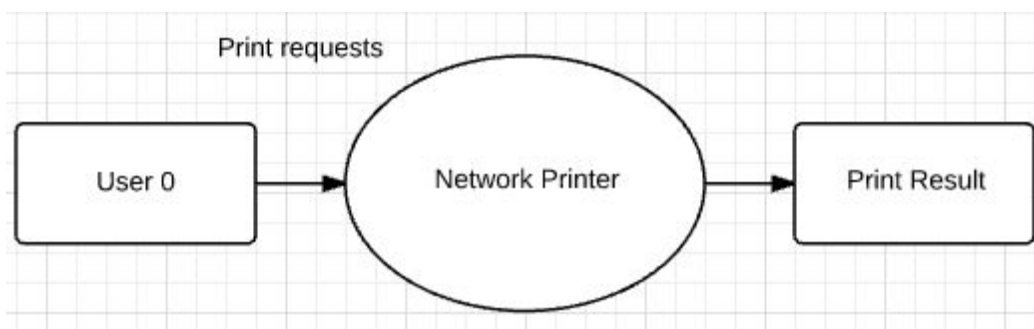
Terms	Definitions
User 0	The user console, sends print requests to the Network Printer to execute.
Network Printer	Receives Print requests and executes them by returning Print Result values.
Print Result	Result of network printer that has executed the print request sent from the User0.
Print requests	The data sent by the User0. It is the only input data the network printer receives from the User0.

3.1.2 Event List

Input/ output event	Description
Print request	A PR is send from the console to the printer.
Stop request	The printers "stop" button is pressed telling the printer to abort the current print job.
Print {Data}	Prints the send data.
Printer Status 'Printing'	Displays the preview of the print request on the LCD screen.
Printer Status 'Servicing'	Warns the user that the printer is currently undergoing servicing by the Admin by displaying 'Servicing' on the LCD screen.

Printer Status 'Waiting'	Tells the user the printer is available for use by the displaying 'Waiting' on the LCD screen.
Show Print Preview	Displays the preview of the print request on the LCD screen.
Admin - register user {User}	User granted access to print
Admin - show user list	Displays a list of current registered users on the network printer in the console.
Admin - unregister user {User}	User deleted access to print
Admin - refill consumables	Admin refills consumable under command sending the printer into "Refill State"
Print error message - queue full	Displays error "Print queue full" on the LCD screen when a print request is received, and the print queue is full.
Print error message - Refill consumables	Displays error "Refill consumables" on the LCD screen when either the ink or paper level = NULL.
Print error message - unregistered user	Displays error "Unregistered User" when an unregistered user send a print request to the printer.
Save Print Result	The network saves the print result in the Paper tray folder.

3.1.3 The System Context Diagram

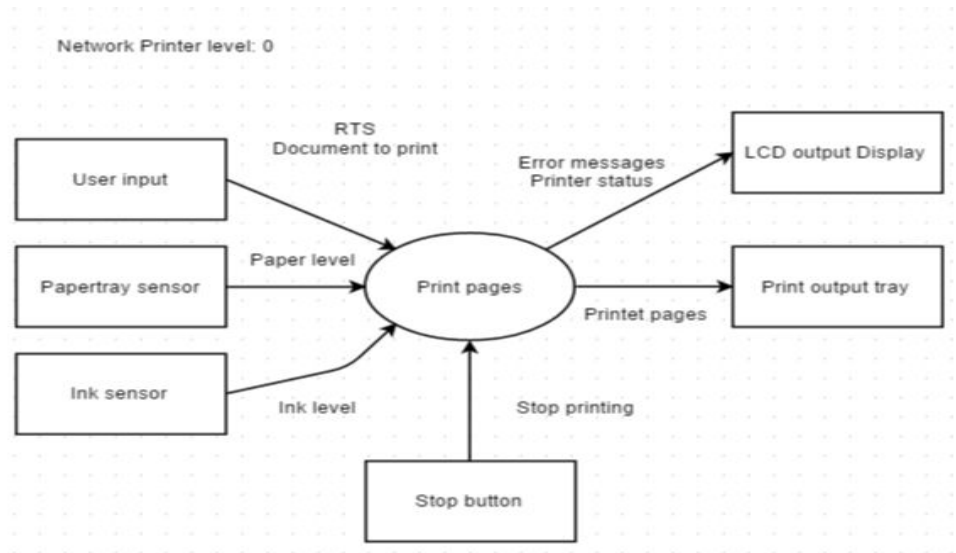


Terms	Definitions
User 0	The user console, sends print requests to the Network Printer to execute.
Network Printer	Receives Print requests and executes them by returning Print Result values.
Print Result	Result of network printer that has executed the print request sent from the User0.
Print requests	The data sent by the User0. It is the only input data the network printer receives from the User0.

3.2 Data Flow Diagram

3.2.1 DFD level 0

3.2.1.1 DFD



3.2.1.2 Process Specification

3.2.1.2.1 Process 1

The Print pages process receives input from the users and consumables sensor and returns printed material and other informations on the LCD screen.

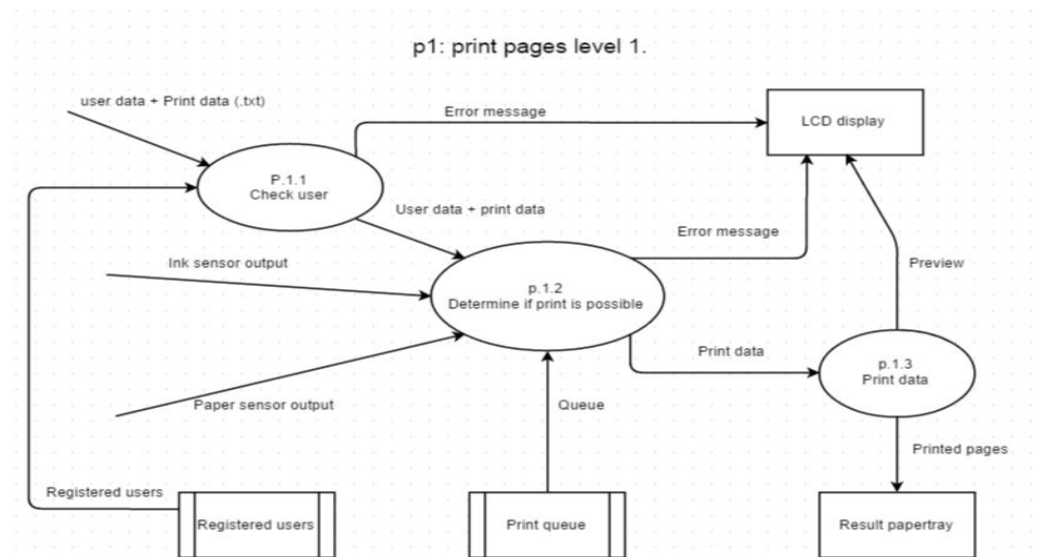
3.2.1.3 Data Dictionary

Terms	Definitions
User input	Sends print request data and user id to Print pages process
Papertray sensor	Sends the amount of paper available to Print process
Ink sensor	Sends the amount of Ink available to Print pages process
Stop Button	Sends the command to stop the current printing process.
Print output tray	Receives the data from print pages process and saves the results in the folder.

LCD output display	Displays Error messages and other information to the user.
--------------------	--

3.2.2 DFD Level 1

3.2.2.1 DFD



3.2.2.2 Process Specification

3.2.2.2.1 Process p.1.1

Receives data from the user in .txt form and checks if the user is registered or not. If the user is confirmed, the process sends data containing the .txt files for printing and user information to process. If the user is not confirmed, an error message is send to the LCD display and .txt file is ignored.

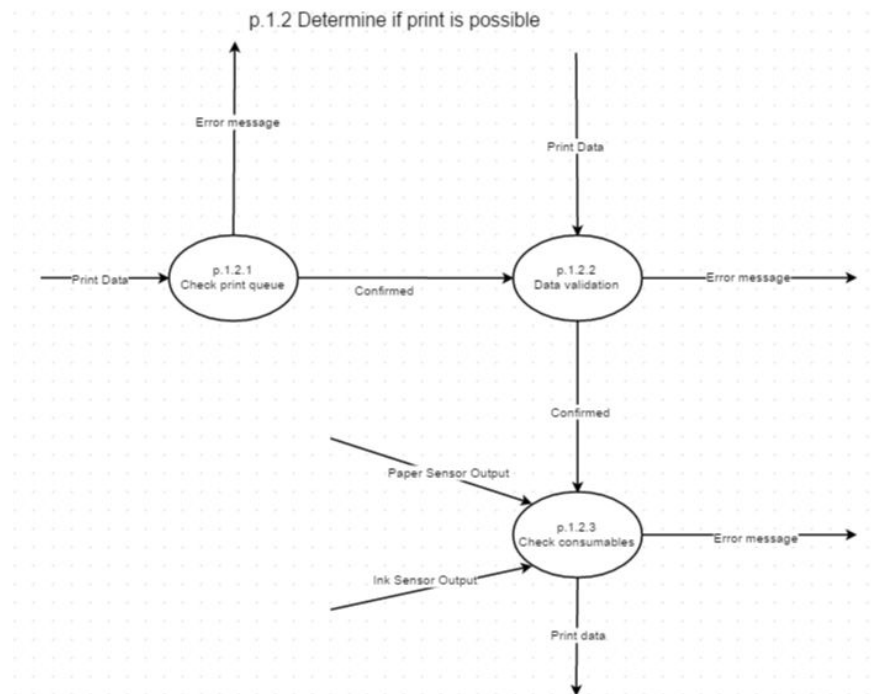
3.2.2.2.2 Process p.1.2

Process checks for three variables:

1. The data is valid
2. Enough paper and ink to execute printing job
3. Status of printing queue

If print is possible, send print data to p.1.3

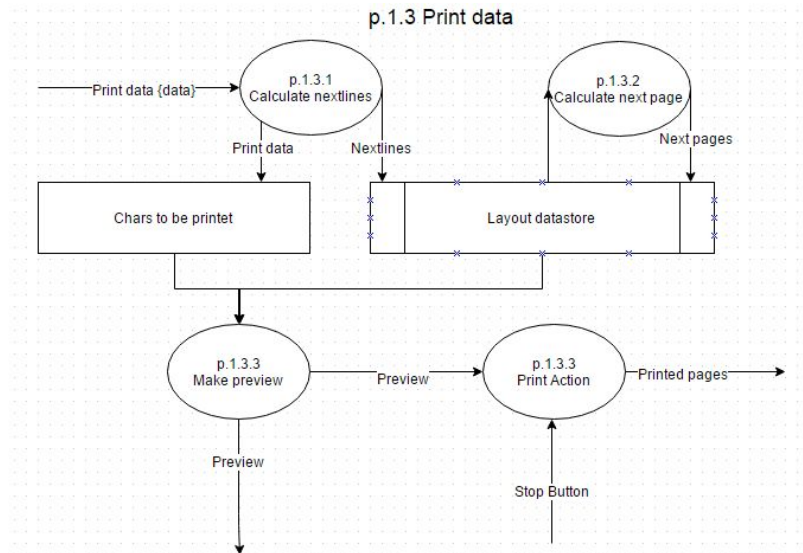
If print not possible show error message on LCD display.



Input /Output Events	Definition	Format /Type
Confimed	check the print queue and send a data to next process	boolean
Consumption	send a consumption data for data printing to next process	struct{int, int,boolean}
print Data	send a print Data for result	string

3.2.2.2.3 Process p.1.3

Prints data received from P.1.2 using paper and ink. Sends the printed result to Result paper tray and preview data to the LCD display.



Input/Output Events	Definition	Format/Type
Print data(data)	The raw data needed to print. Sent from the User	.txt
Nextlines	Adjusts the number of characters in a line to meet the constraint	int
Nextpages	Adjust the number of lines in a page to meet the constraint	int
Make preview	Process that creates the preview of the print request based on the data from Layout datastore	string
Preview	Data that contains the preview of the print request	string
Print Action	Process that consumes ink and paper based on preview data and sends 'Printed pages' to the Papertray	.txt

3.2.2.2.4 Process p. 1.3.1

Gets the print data and calculates how many lines it will take to print the data. Stores the characters to be printed in a datastore and the location of the next lines in a separate datastore.

3.2.2.2.5 Process p. 1.3.2

Gets the number of next lines from the datastore and calculates the location of when to start printing on the next page. Saves the location of next page in the layout datastore.

3.2.2.2.6 Process p. 1.3.3

Calculates a preview of the data by combining the layout with the

characters to be printed. Sends the preview to the LCD screen for display. Sends the preview to process 1.3.4 for printing.

3.2.2.2.7 Process p. 1.3.4

Prints the pages by getting the preview from process 1.3.3.

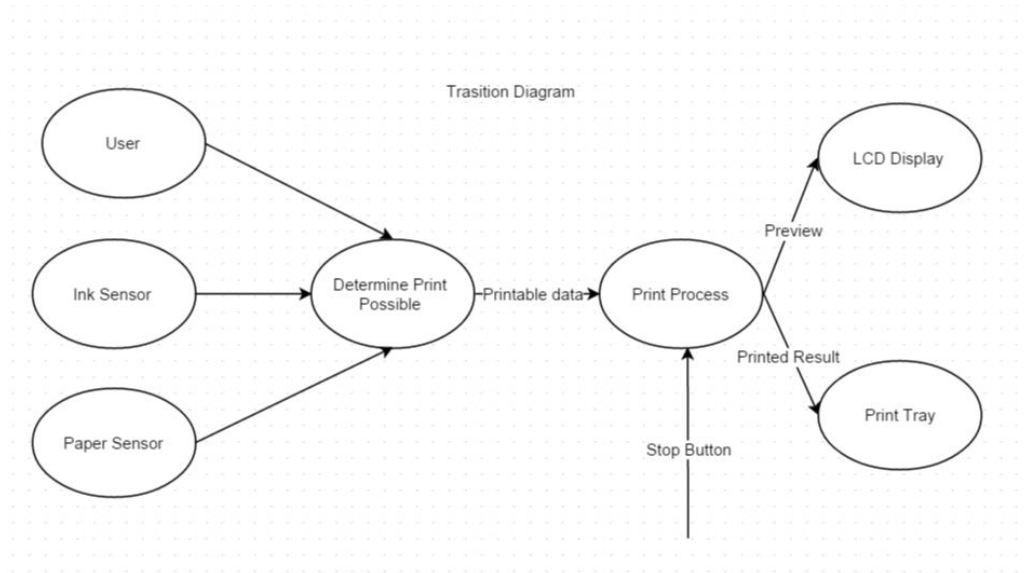
Puts the printed pages in the result paper tray.

This process can be stopped at anytime if the stop button is pressed.

3.2.2.3 Data Dictionary

Input/Output Events	Definition	Format/Type
Check user	Compares list of users with print access with the user that sent the current print request.	Boolean
Registered Users	Database of users with access to the network printer.	string
Determine if print is possible	A process that validated the print request sent by the user.	.txt
Print queue	Database of valid print request the printer has received but not yet executed.	.txt
LCD display	Output device that displays the error messages, print previews, print queue, and other information.	
Print Data	Process that formats the data which is 'printed' and saved as a .txt file.	
Result papertray	File that holds the data from Print data process	

3.2.2.4 State Transition Diagram



3.2.3 Overall DFD