Structured Analysis

Network Printer System

컴퓨터 공학부

201211382 조상윤
201211351 박현준
201210916 이찬형
201211336 김윤후
201560495 서보민

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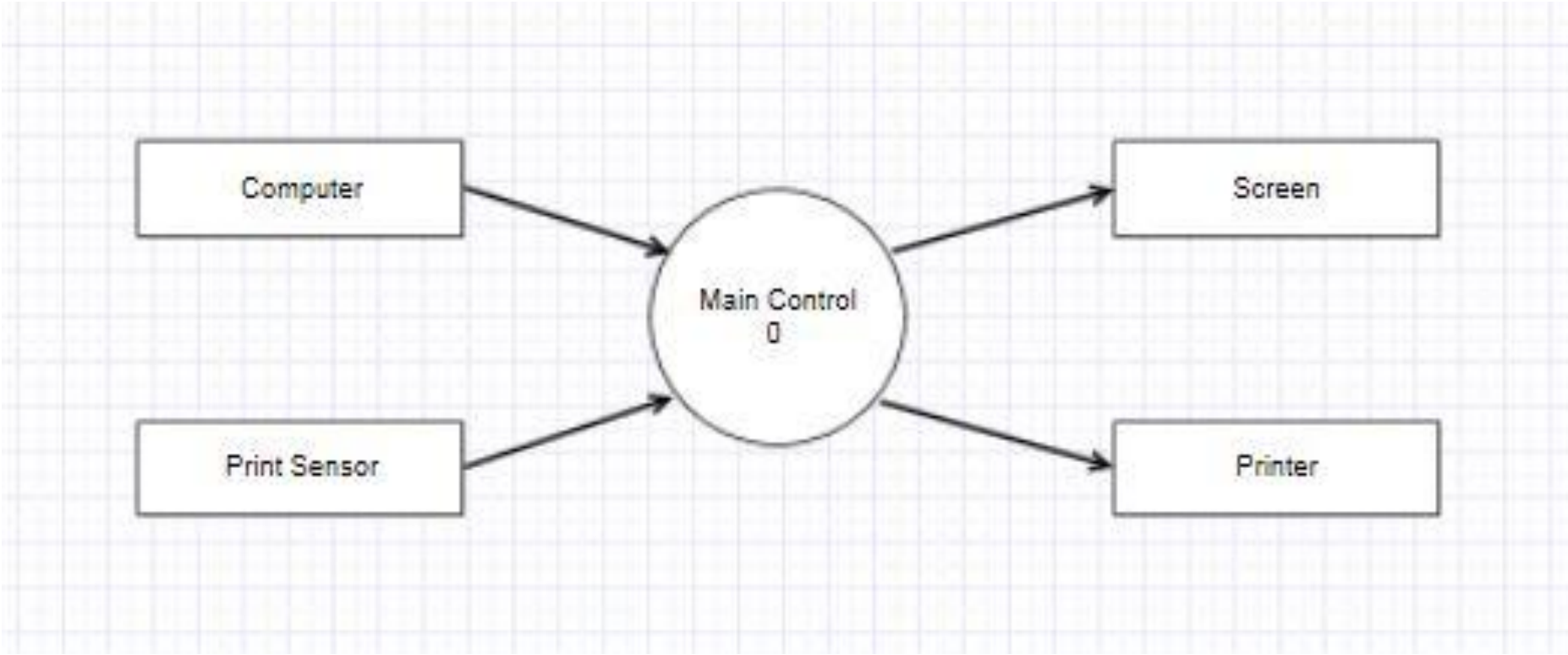
1. Statement of purpose

- 프린터는 다수의 사용자로부터 출력 요청을 받아 출력물을 만들어 낸다.
- 여러 사용자가 동시에 출력을 요청할 경우, 가장 먼저 온 순서대로 출력한다.
- 관리자에 의해 사용자 등록 및 삭제가 가능하다.
- 관리자는 현재 등록된 사용자를 확인할 수 있다.
- 용지 및 잉크가 부족할 경우 출력이 불가능하다.
  (프린터는 인쇄 전 용지 및 잉크의 잔량을 확인해 사용자에게 보여준다.)
- 프린터의 잉크는 출력하는 글자수에 비례해 줄어든다.
- 프린터의 종이 및 잉크는 관리자에 의해 충전된다.

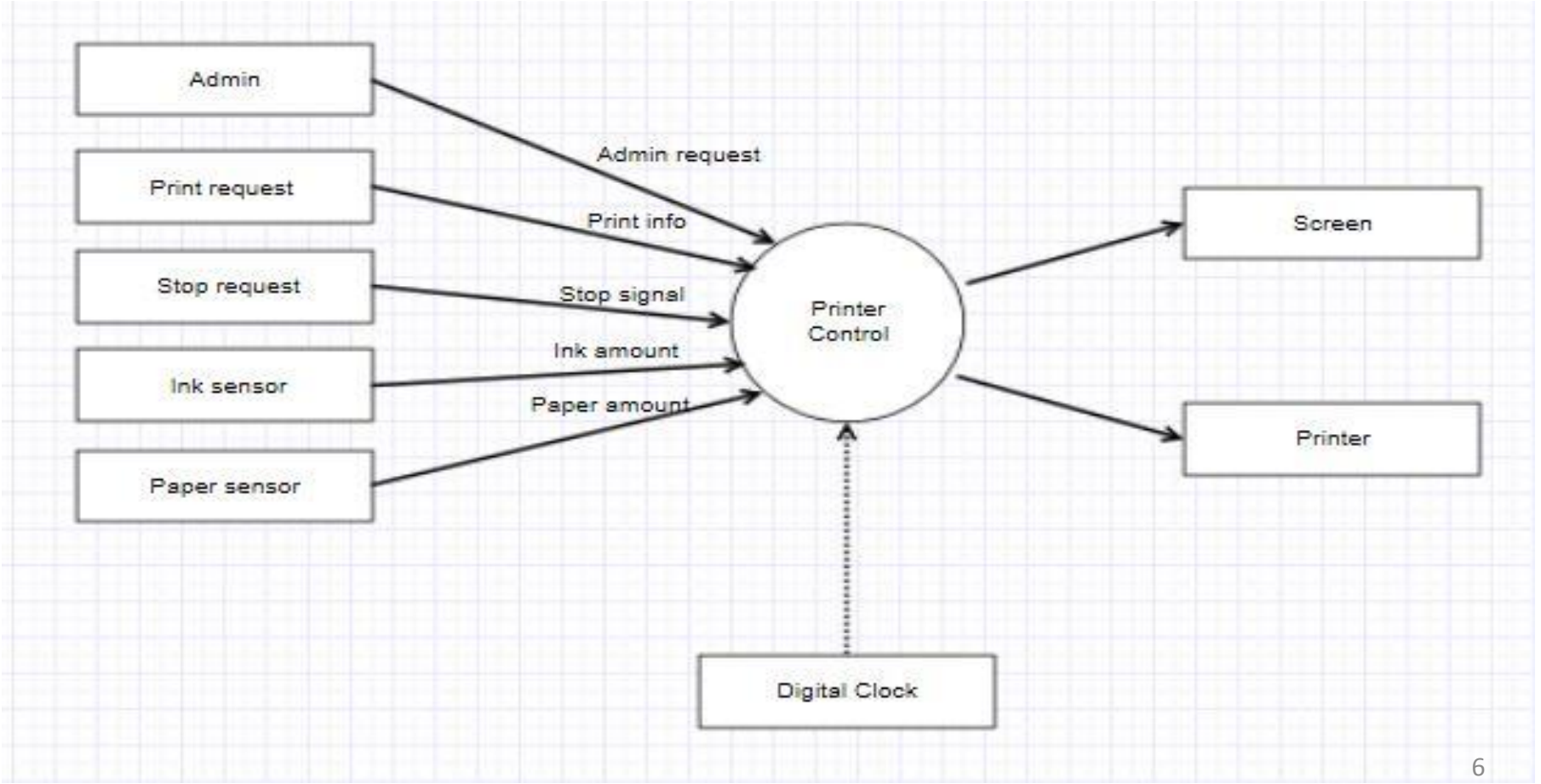
1. Statement of purpose

- 사용자로부터 프린트 요청 데이터를 입력 받는다.
- 프린터는 “*.txt” 파일을 출력한다.
- 프린터의 출력 결과를 화면에 보여준다.
- 하드웨어 버튼을 통해 인쇄 중지 요청을 할 수 있다
- 인쇄 중 중지 요청이 들어오면 현재 인쇄중인 문서의 인쇄를 중단한다.

Basic System Context Diagram



System Context Diagram

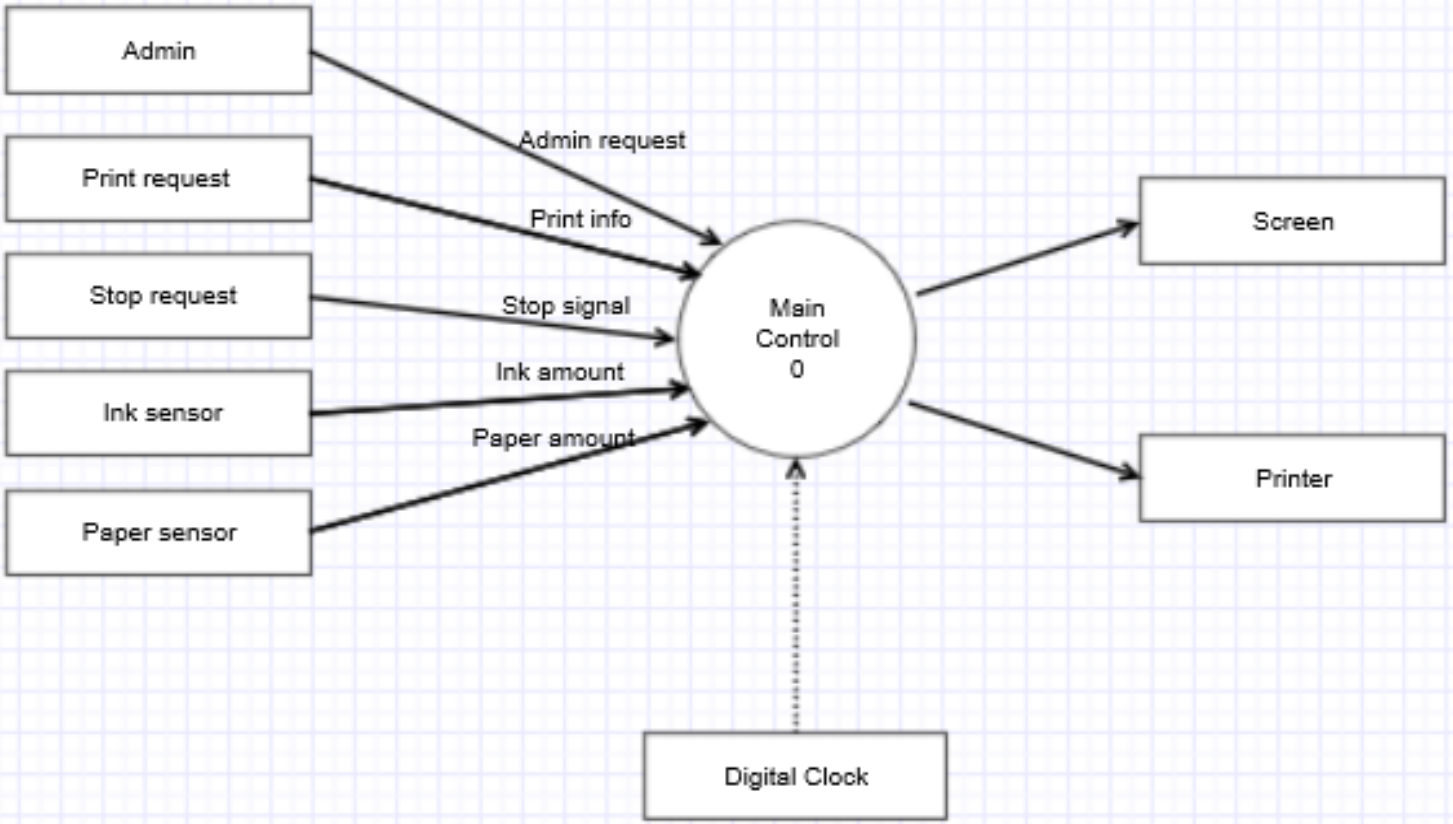


3. Event List

INPUT/OUTPUT EVENT LIST	Description
Admin	Register&delete user, Ink & pa per recharge EVENT
Print Request	Print information (page, conten ts, user information) EVENT
Stop Request	Check stop signal EVENT
Ink Sensor	Check Ink amount EVENT
Paper Sensor	Check paper amount EVENT
Screen	Show information on print scre en
Printer	Outputs print information requ ested

4. Data Flow Diagram

DFD Level 0



Process Specification

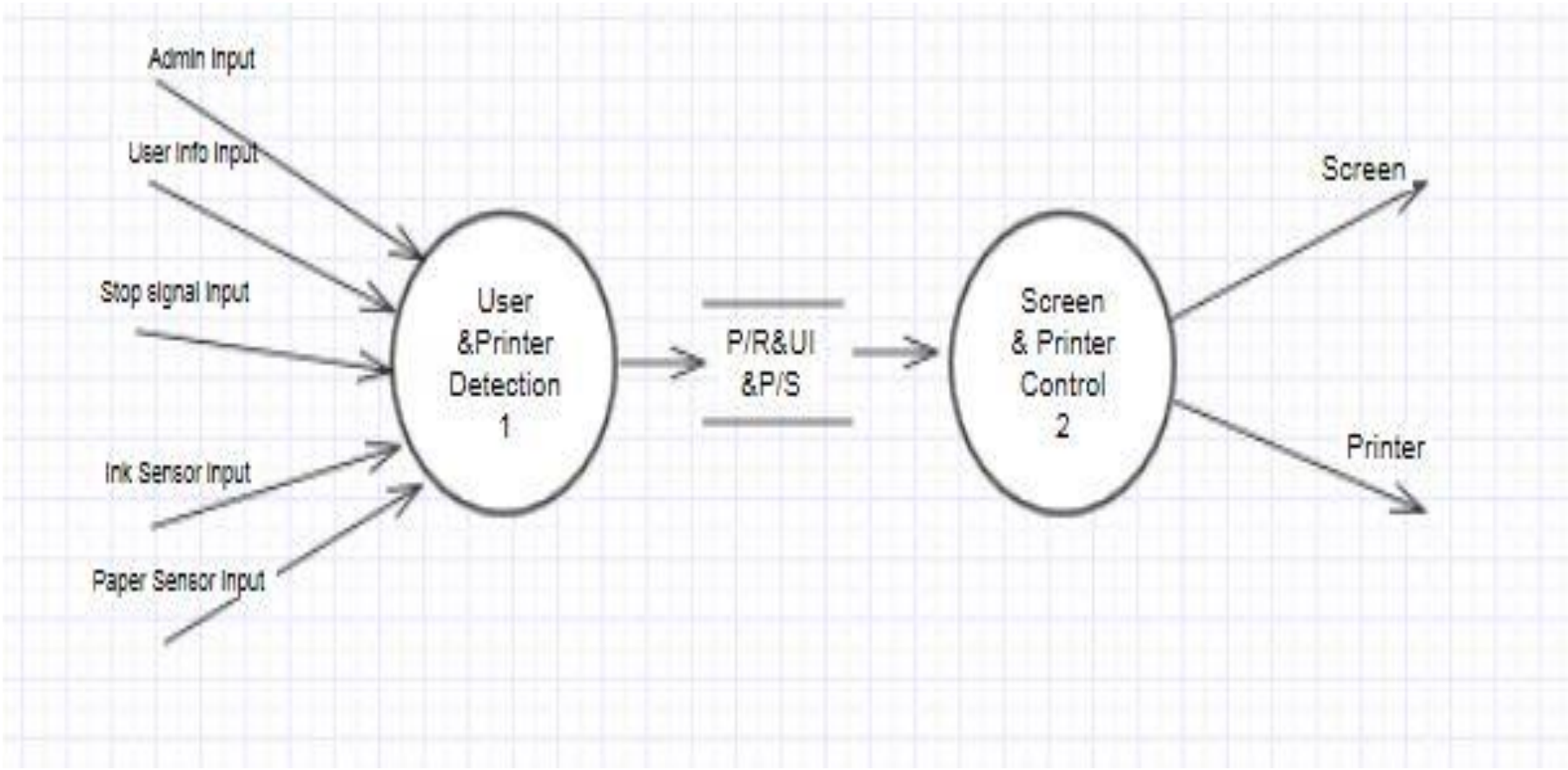
Reference No.	0
Name	Main control
Input	Print & stop &Admin request, Ink & paper amount,
Output	The state of print or stop. User's name, con text of Prints
Process Description	This is received 5 Data. In case of request o f admin, this can register User, remove User , refill Ink & paper. In case of Request of Print, this can identify user's information in User DB and send pri nts's information to printer. In case of Request of Stop, this can stop pr inting prints In case of Signal of Ink sensor and paper s ensor, can check amount of Ink & paper

Data Dictionary

Data Name	Description	Format/Type
Admin request	Recive the data from the administ tor's computer (delete/resist).	T/F , interrupt
Print info	It saves boolean data that chang ed the user's info and print requ est.	Double, String
Stop signal	Detects click of the stop button.	T/F, interrupt
Ink amount	Recive the ink's amount from the ink's sensor	0~3000, interrupt
Paper amount	Recive the ink's amount from the ink's sensor	0~100, interruput

4. Data Flow Diagram

DFD Level 1



Process Specification (1/2)

Reference No.	1
Name	User &Printer Detection
Input	User info, Admin, Stop signal, Ink senso r, Paper sensor
Output	Data of Printer Request, User info, Stat e of print
Process Description	This can encode with the data from sig nal

Process Specification (2/2)

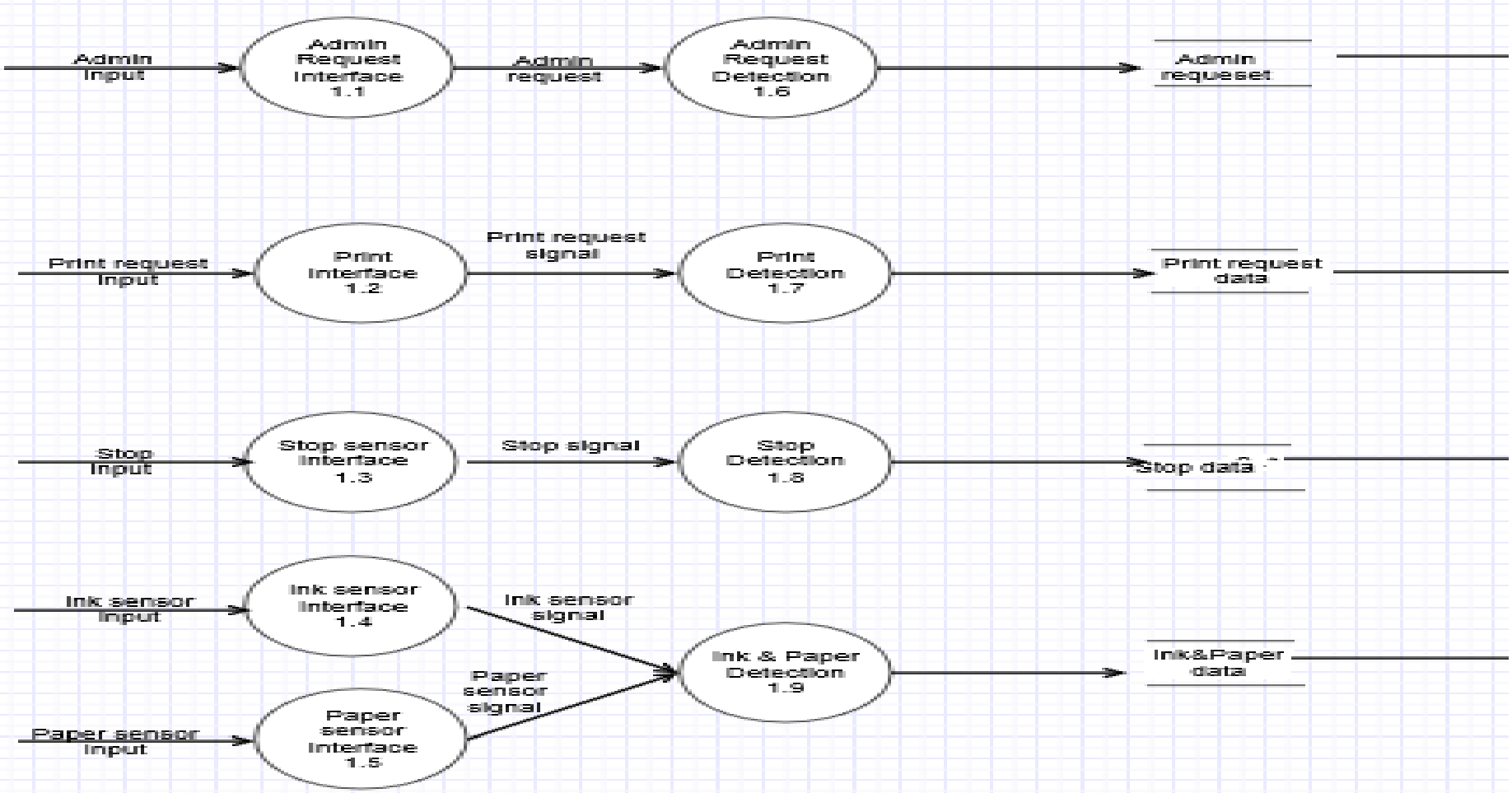
Reference No.	2
Name	Screen &Printer Control
Input	Data of P/R, U/I, P/S
Output	Show on the display of printer Print out prints on the paper.
Process Description	This control can show on display accordi ng to received data from detection or pri nt the prints

Data Dictionary

Input & Output Event	Description
P/R & UI & P/S	Screen & Printer control sends the information received from User & Printer Detection(Information is print request, user's info and printer status.)

4. Data Flow Diagram

DFD Level 2



Process Specification(1/9)

Reference No.	1.1
Name	Admin Request interface
Input	Admin input
Output	Admin request
Process Description	Receive admin input and send admin request to Admin request detection

Process Specification(2/9)

Reference No.	1.2
Name	Print interface
Input	Print request input
Output	Print request signal
Process Description	Receive Print request from user and deliver Char type of User name and text type of file signal to Detection

Process Specification(3/9)

Reference No.	1.3
Name	Stop Sensor Interface
Input	Stop signal input
Output	Stop signal
Process Description	Get the value from “User’s computer" or "Network printer". And the vlaue converts the value to a Boolean type T / F signal (Stop Signal). And passes the converted value to Stop detection.

Process Specification(4/9)

Reference No.	1.4
Name	Ink Sensor Interface
Input	Ink Sensor input
Output	Ink Sensor signal
Process Description	Get the input value from Printer's ink sensor and send signal for printer's ink state(data?)

Process Specification(5/9)

Reference No.	1.5
Name	Paper Sensor Interface
Input	Paper Sensor input
Output	Paper sensor signal
Process Description	Get the input value from Printer's Paper sensor and send signal for printer's pap er state(data)

Process Specification(6/9)

Reference No.	1.6
Name	Admin request detection
Input	Admin request
Output	Admin request
Process Description	Receive admin request and send admin request to Admin request data store

Process Specification(7/9)

Reference No.	1.7
Name	Print Detection
Input	Print request signal
Output	Print request info
Process Description	Stores the data received in the Print request to Print request data store

Process Specification(8/9)

Reference No.	1.8
Name	Stop Detection
Input	Stop signal
Output	Stop status
Process Description	If the inputed data equal to the stop command, and stores 1 in the 'S'. However, if the inputed data is different from the stop command, and stores 0 in the 'S'.('S' is "int" type data store.)

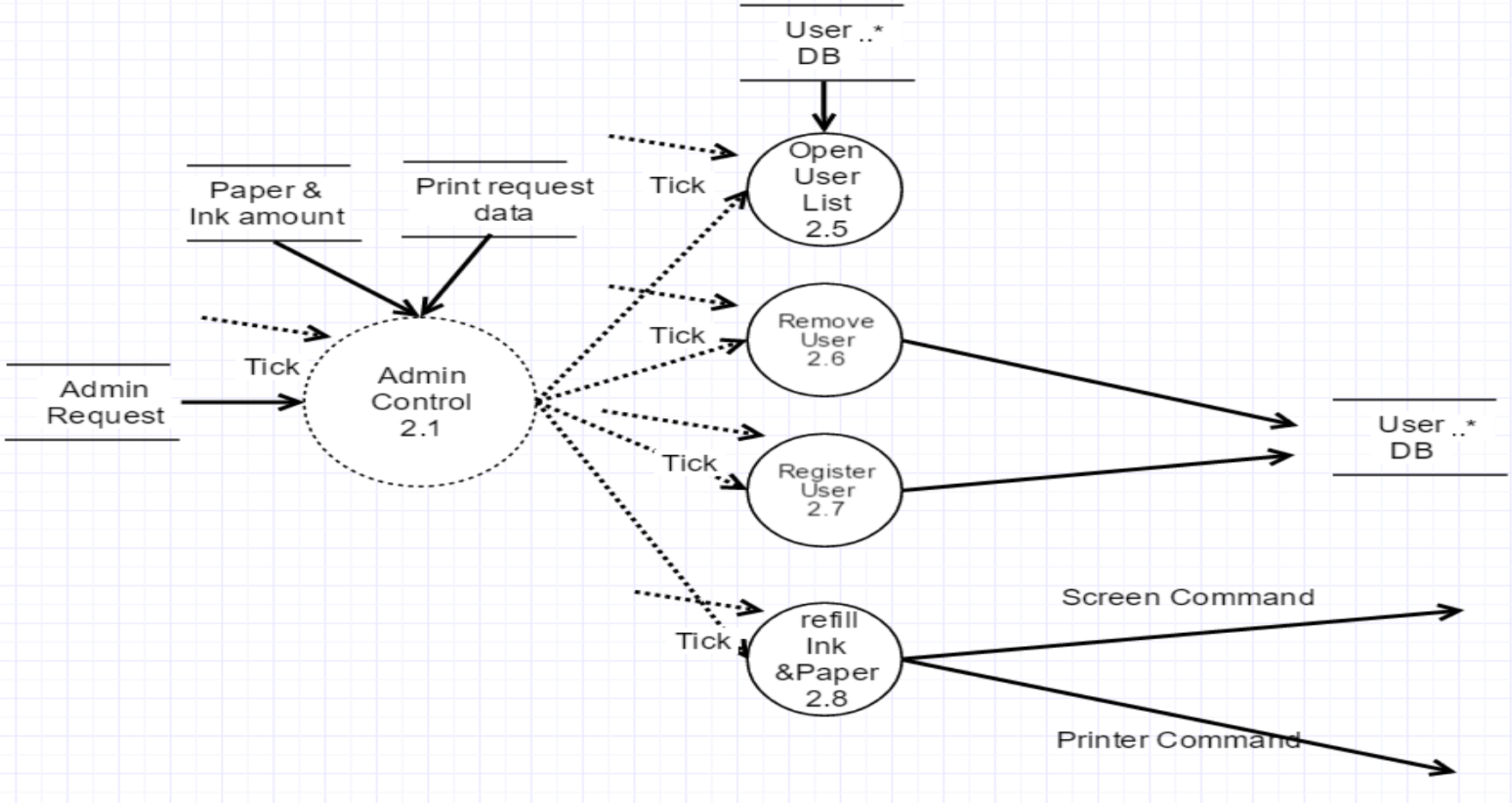
Process Specification(9/9)

Reference No.	1.9
Name	Ink & Paper Detection
Input	Ink Sensor signal, Paper Sensor signal
Output	Ink & Paper state
Process Description	Store data for printer's ink state and paper state in the 'I&P'('I&P' is data store)

Data Dictionary

Input/Output Event	Description	Format / Type
Admin request	Receive the data from the administor's computer(delete/regist).	T/F, interrupt
Print request signal	include user information and include content, number of character, number of page	Double, String
stop signal	Detects click of the stop button.	T/F, interrupt
Ink sensor signal	Recive the ink's amount from the ink's sensor	0~3000, interrupt
Paper sensor signal	Recive the ink's amount from the ink's sensor	0~100, interruput
Admin request	Store the data from the administor's computer (delete/regist).	Double, String
print request data	Store user information and include content, number of character, number of page	Double, String
stop data	Save Stop signal state	T/F, interrupt
ink & paper data	Store ink state and paper state	
user DB	Store list of user that registered by admin	String

DFD Level 3-1


User ..*
DB
Paper &
Ink amount
Print request
data
Tick
Open
User
List
2.5
Admin
Request
Tick
Admin
Control
2.1
Tick
Remove
User
2.6
Tick
Register
User
2.7
User ..*
DB
Tick
refill
Ink
&Paper
2.8
Screen Command
Printer Command

Process Specification(1/4)

Reference No.	2.1
Name	Admin Control
Input	Admin Request
Output	User data, Ink & Paper amount
Process Description	Processes the admin request and executes the desired command

Process Specification(2/4)

Reference No.	2.5
Name	Remove User
Input	User Data
Output	Removed user data
Process Description	Processes the admin request and executes the desired command

Process Specification(3/4)

Reference No.	2.6
Name	Register User
Input	User Data
Output	Register user data
Process Description	This process adds a new user in the database. The user data is given in the input.

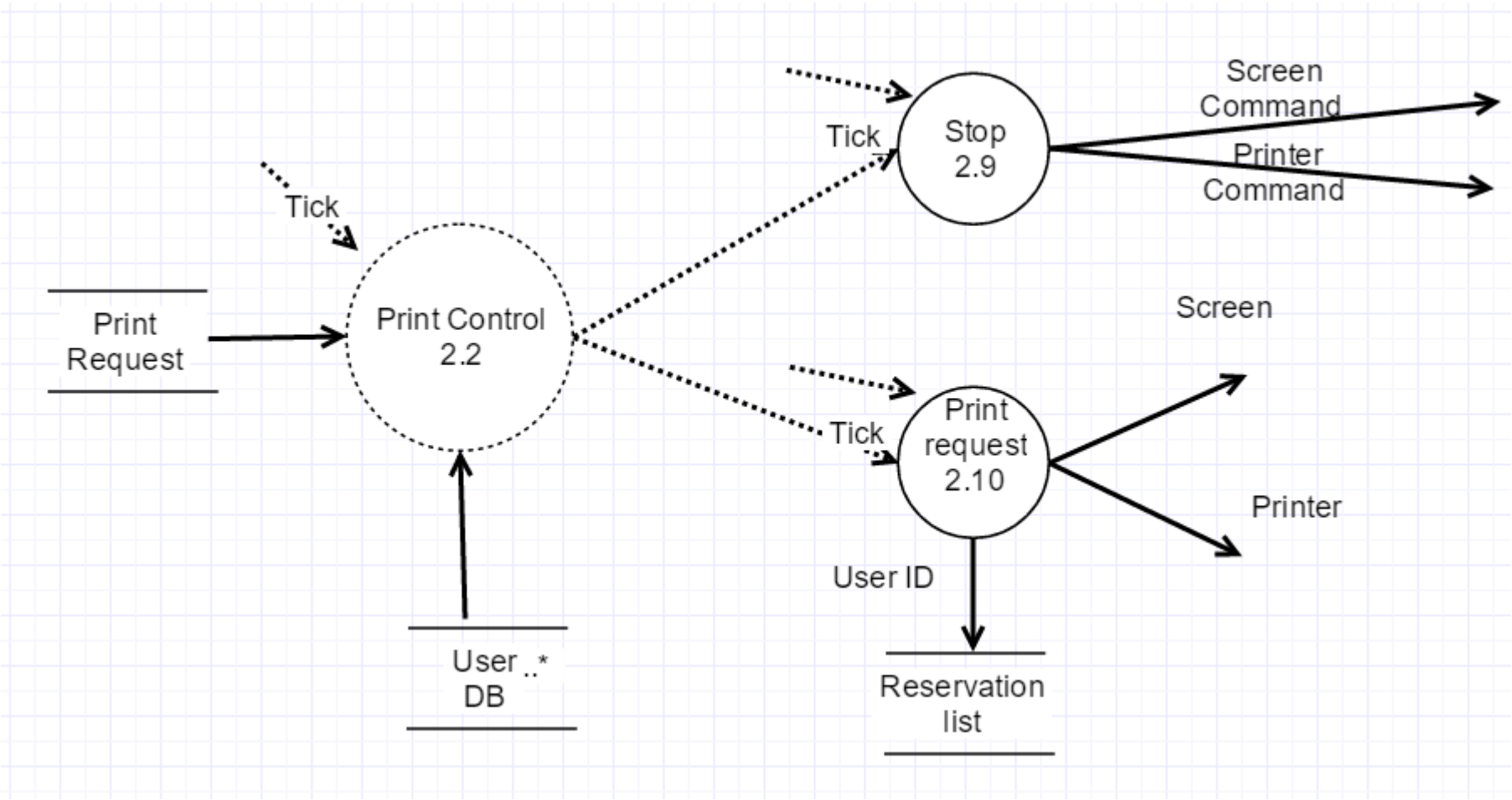
Process Specification(4/4)

Reference No.	2.7
Name	Refill Ink & Paper
Input	Ink & Paper amount
Output	Screen command, Print command
Process Description	This process creates a request to unlock the printer and displays it on the screen.

Data Dictionary

Input/Output Event	Description	Format/ Type
Admin request	Store the data from the administor's computer(delete/regist).	Double, String
Paper & Ink amount	Store paper state and ink state	double
Print request data	Store user's request (user information and include content, number of character, number of page)	Double, String
User DB	Store list of user that registered by admin	String
Screen Command	Command to display state at screen	Double, String
Printer Command	Commands to print user's request	Double, String

DFD Level 3-2


Tick
Print Request
Print Control 2.2
User DB
Tick
Stop 2.9
Screen Command
Printer Command
Tick
Print request 2.10
Screen
Printer
User ID
Reservation list

Process Specification(1/3)

Reference No.	2.2
Name	Print Control
Input	Print request info
Output	Stop command, Print request information
Process Description	Check User on User DB. Stop command is delivered to the Stop interface when user mismatched and Print request information is delivered to the Print request interface when user matched

Process Specification(2/3)

Reference No.	2.8
Name	Stop interface
Input	Stop command
Output	Screen command, Print command
Process Description	Stop command가 들어올 경우 프린트 작업을 중지한다. (Receive Stop command and stop print)

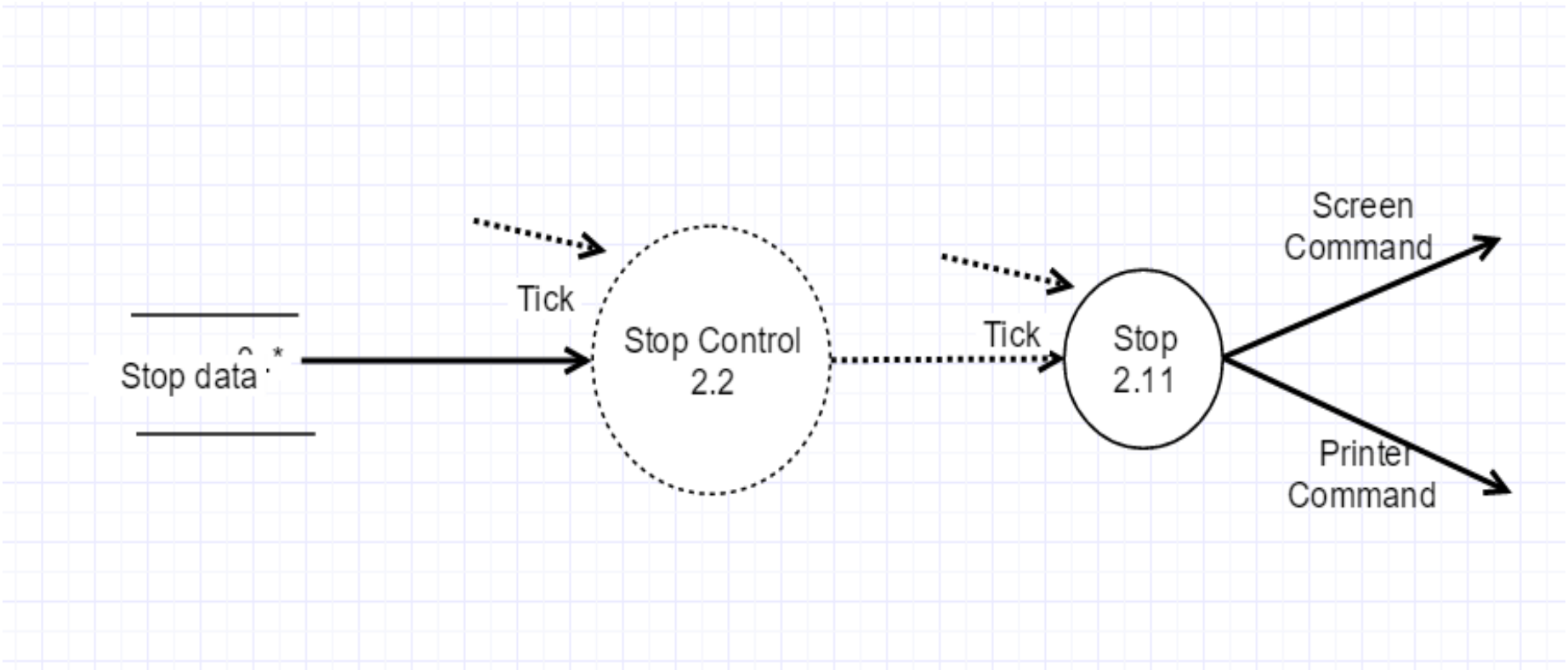
Process Specification(3/3)

Reference No.	2.9
Name	Print request interface
Input	Print request information
Output	Print request information, Print contents, User ID
Process Description	Screen으로 Print request information , Printer로 Print contents, Reservation list 에는 User ID가 전달된다. (Deliver Print request information to Screen, Print contents to Printer and User ID to Reservation list)

Data Dictionary

Input/Output Event	Description	Format/ Type
Admin request	Store the data from the administor's computer(delete/regist).	Double, String
Paper & Ink amount	Store paper state and ink state	Double
Print request data	Store user's request (user information and include content, number of character, number of page)	Double, String
User DB	Store list of user that registered by admin	String
Screen Command	Command to display state at screen	Double, String
Printer Command	Commands to print user's request	Double, String

DFD Level 3-3


Tick
Stop data
Stop Control
2.2
Tick
Stop
2.11
Screen
Command
Printer
Command

Process Specification(1/2)

Reference No.	2.2
Name	Stop Control
Input	Stop data
Output	Screen Command, Print Command
Process Description	Receive data about a Printer Stop command, and checks the state of the data. And send a Command to Screen Interface and Print Interface.

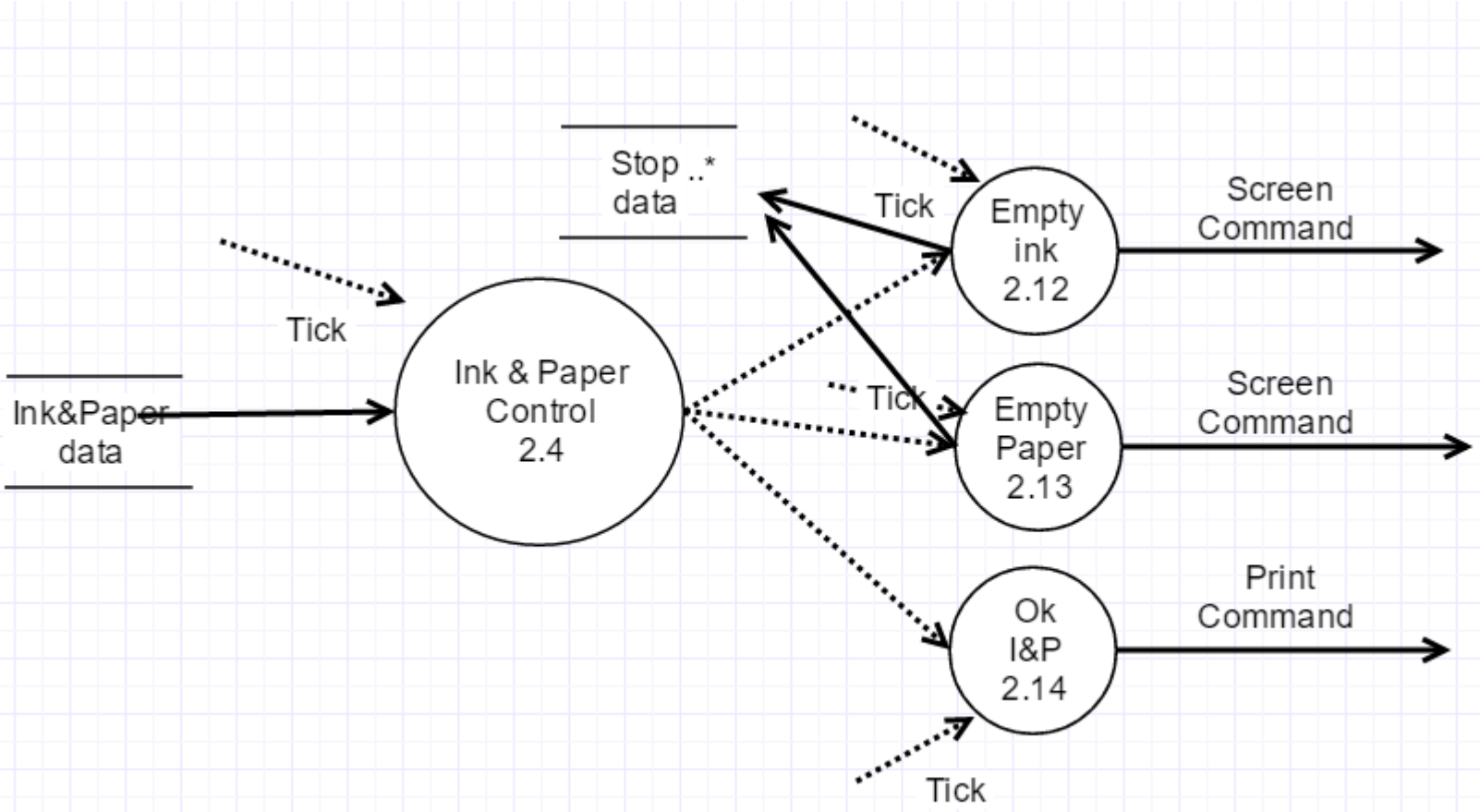
Process Specification(2/2)

Reference No.	2.10
Name	Stop by S-Btn
Input	Stop data
Output	Screen Command, Print Command
Process Description	Receive data about a Printer Stop command, and checks the state of the data. And send a Command to Screen Interface and Print Interface.

Data Dictionary

Input/Output Event	Description	Format/ Type
Stop data	Save Stop signal state	T/F, interrupt
Screen Command	Command to display state at screen	Double, String
Printer Command	Commands to print user's request	Double, String

DFD Level 3-4


Stop ..*
data
Tick
Empty
ink
2.12
Screen
Command
Tick
Ink & Paper
Control
2.4
Ink&Paper
data
Tick
Empty
Paper
2.13
Screen
Command
Ok
I&P
2.14
Print
Command
Tick

Process Specification(1/4)

Reference No.	2.4
Name	Ink & Paper Control
Input	Ink & Paper data
Output	Ink data / Paper data / Ink & Paper data
Process Description	If ink's state or paper's state don't have enough , send a Command to Screen Interface. And if both ink state and paper state are enough, send a Command to Screen interface and Print interface.

Process Specification(2/4)

Reference No.	2.11
Name	Ink Empty
Input	Ink data
Output	Screen command
Process Description	Receive ink data and show ink status.

Process Specification(3/4)

Reference No.	2.12
Name	Paper Empty
Input	Paper data
Output	Screen command
Process Description	Receive paper data and show paper status.

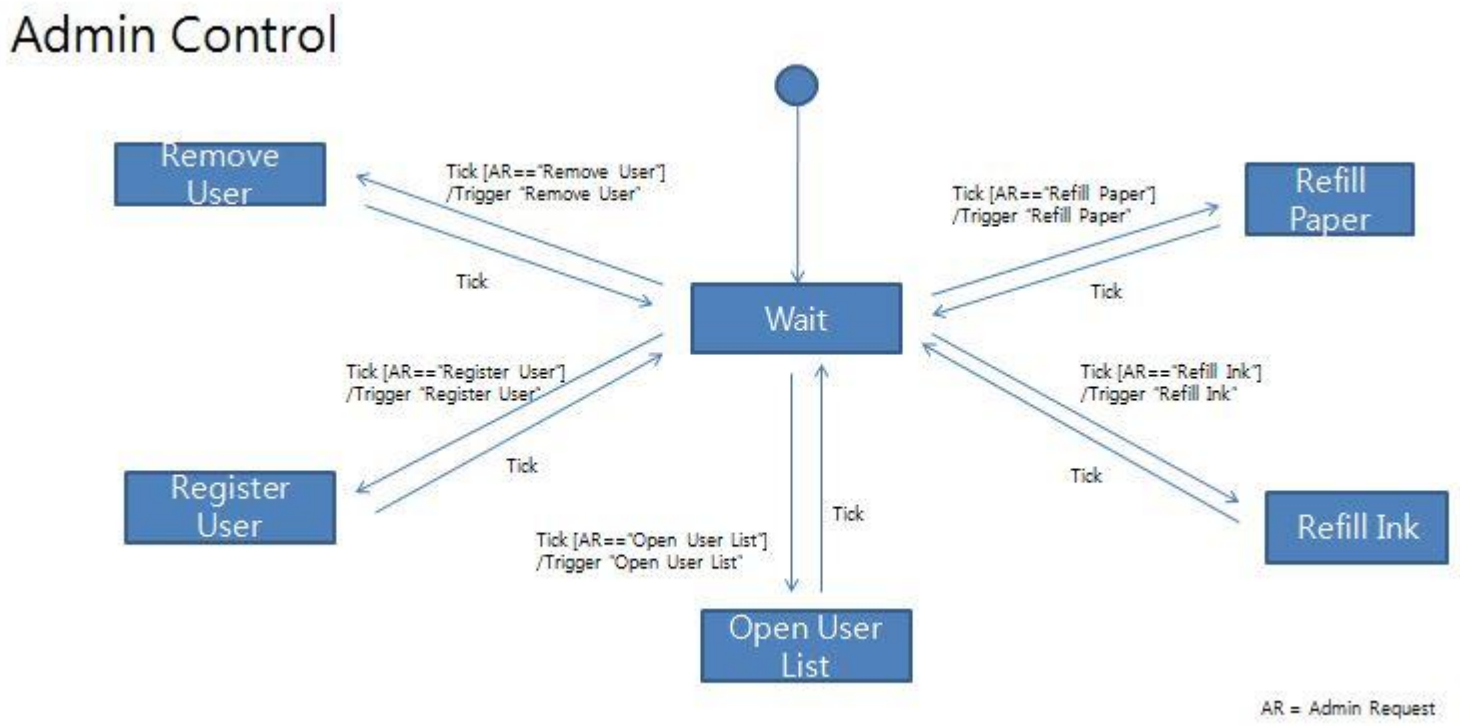
Process Specification(4/4)

Reference No.	2.13
Name	OK I&P
Input	Ink & Paper amount
Output	Print command
Process Description	Receive ink & paper amount and do print command

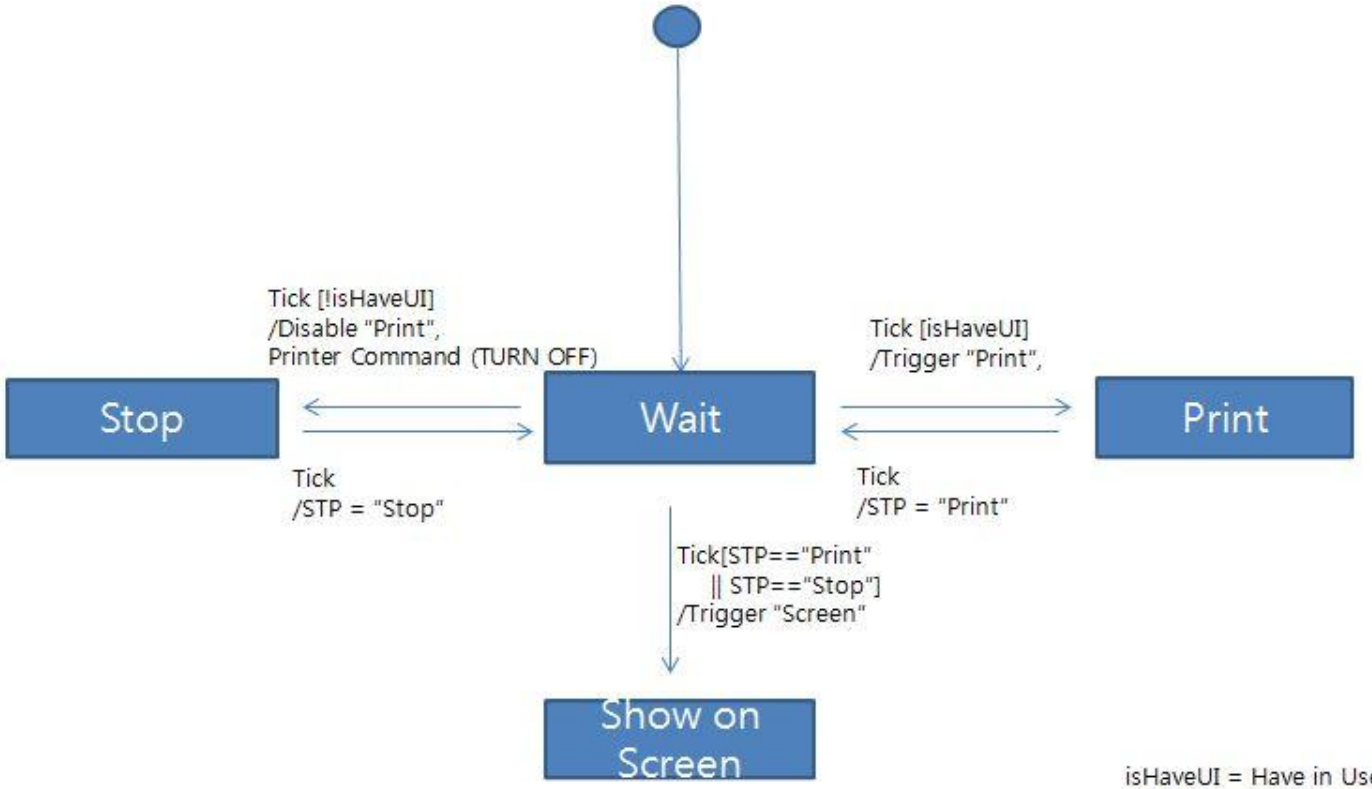
Data Dictionary

Input/Output Event	Description	Format/ Type
Ink & Paper data	Store paper state and ink st ate	Double, String
Stop data	Save Stop signal state	T/F, interrupt
Screen Command	Command to display state a t screen	Double, String
Printer Command	Commands to print user's r equest	Double, String

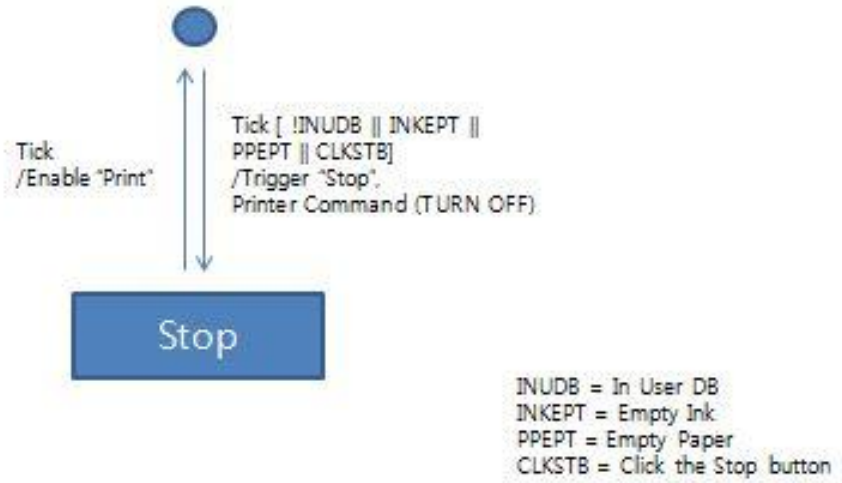
State Transition Diagram
- STD Admin Control 2.1



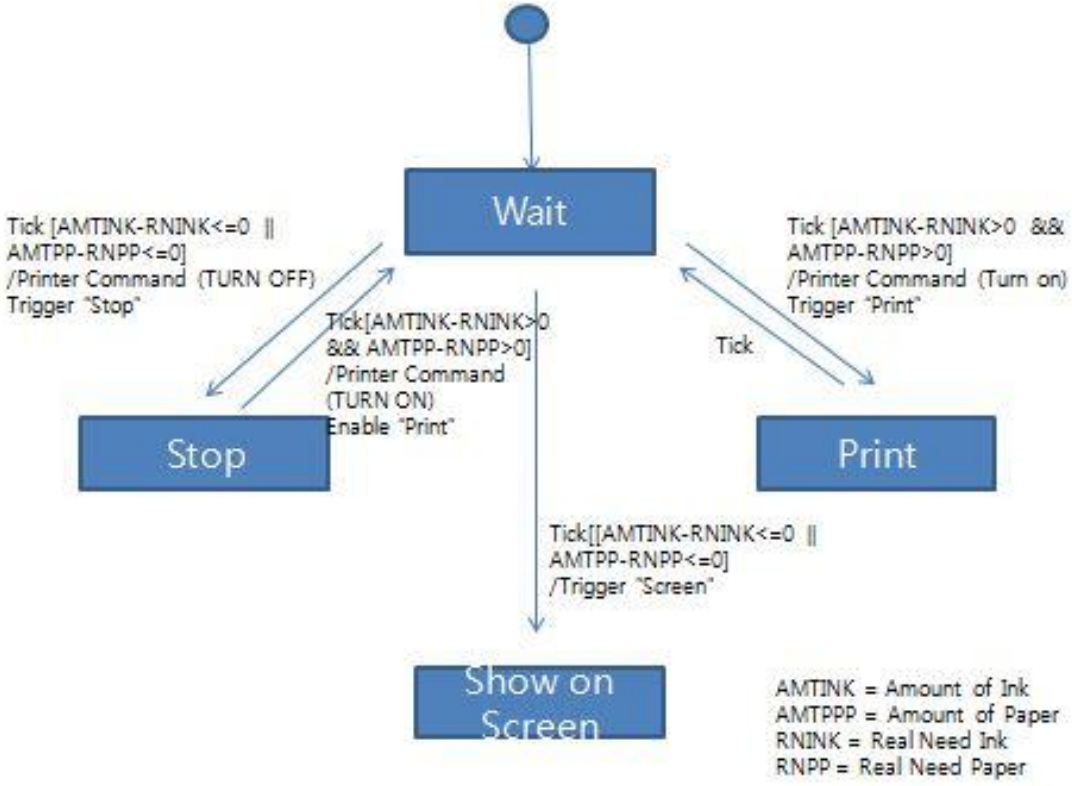
State Transition Diagram
- STD Print Control 2.2



State Transition Diagram
- STD Stop Control 2.3

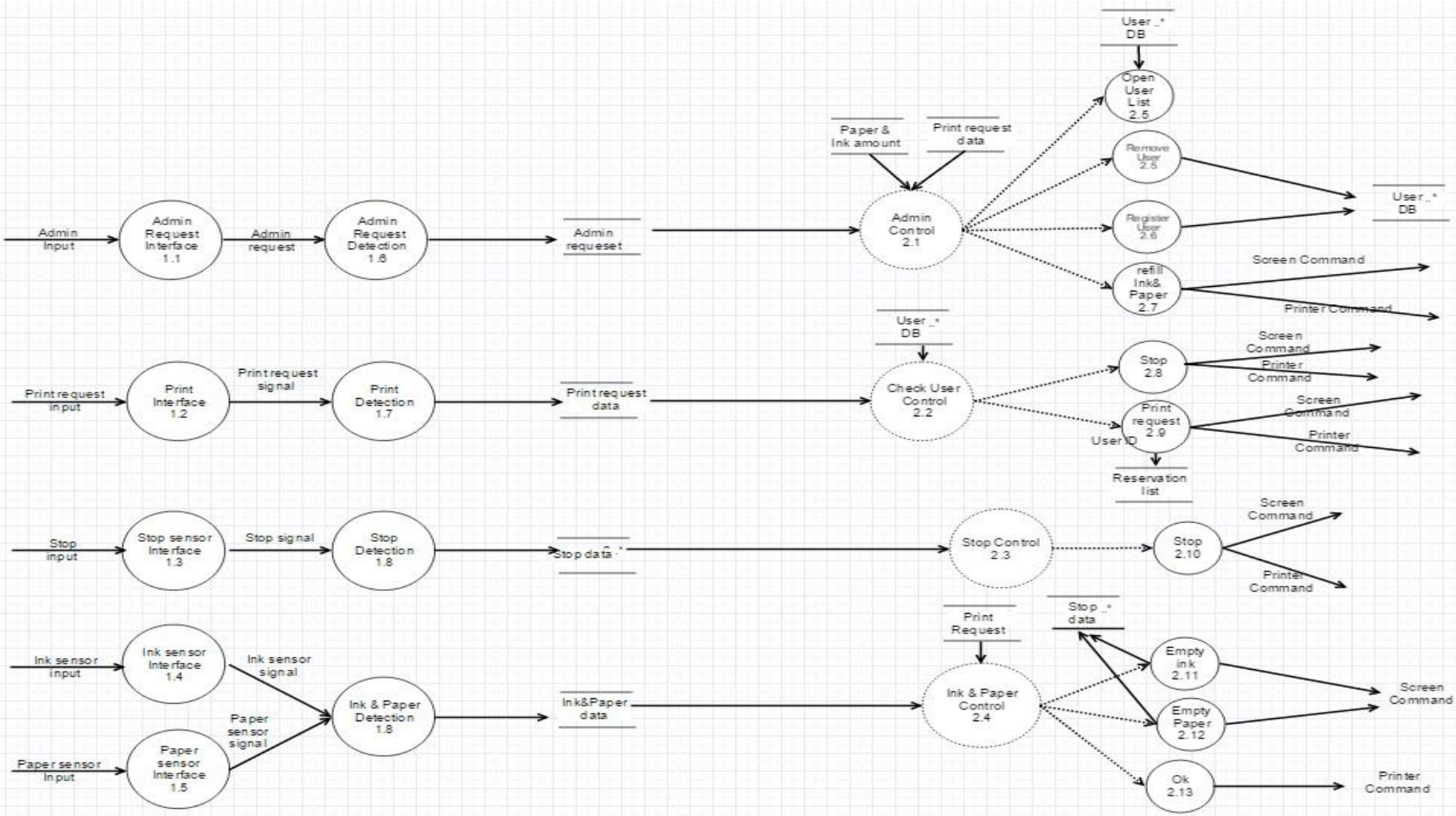


State Transition Diagram
- STD Ink & Paper Control 2.4



4. Data Flow Diagram

Overall DFD



Q & A

THANK YOU!