CFG Generator

Structured Analysis

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Environmental Model

- Statement of Purpose
- Software Requirement Specification
- System Context Diagram
- Event List

Statement of Purpose

Control Flow Graph Generator

Testing has two approaches. One is structural testing and the other is functional testing. In functional testing, experts conduct testing against project specifications. And in structural testing, experts conduct testing against structure of project. Structure of project is defined some models. In this project we use CFG (Control Flow Graph) which is one of model used in structure testing. When our program receives a c source code, the program converts the source code to CFG

Software Requirement Specification

1.External interface requirement
- 1.1 Report with a text (*.txt) file.
- 1.2 The report show all states and edges of CFG

2. Functional Requirement
- 2.1 Execution
  - 2.1.1 The program uses CUI
    - e.g.) ./CG Inputcode.c result.txt
  - 2.1.2 when a user inputted unpermitted command, the program shows 'help' (that includes command syntax.)
- 2.2 Report generating process
  - 2.2.1 Report shows execution order of c source code.
  - 2.2.2 when c source code inputted successfully, program shows "success" message. Or in error case, the program shows "error" and terminates the program
  - 2.2.3 Before the program converting CFG, shows "converting" message.

Software Requirement Specification

2.2.3 Before the program converting CFG, shows "converting" message.

2.2.4 After report generating process, the program shows the name of report file.

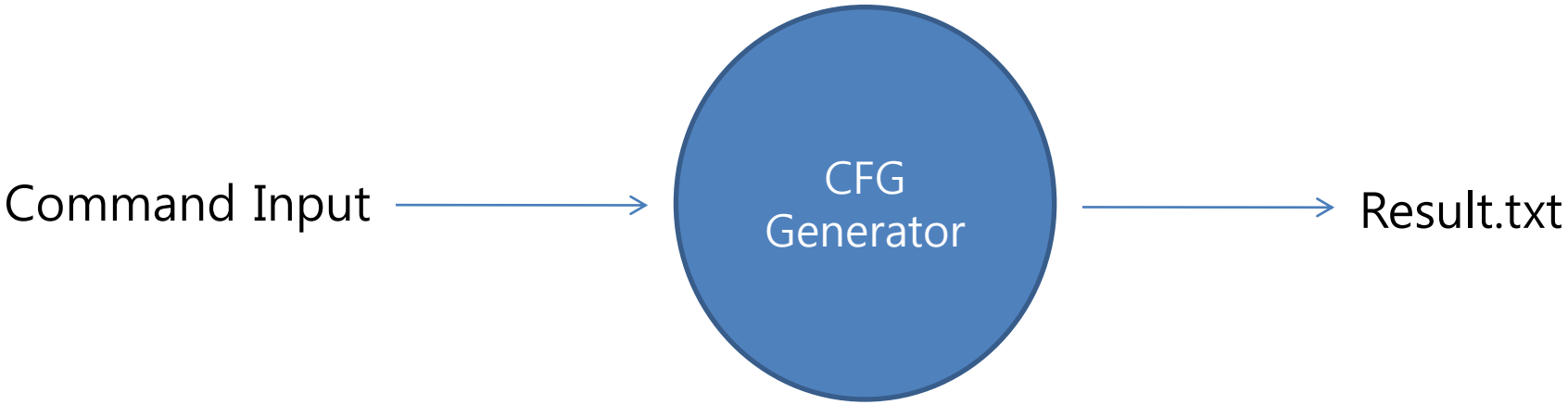
3. Performance Requirement

3.1 C source code has 100~200 lines. It includes main function.

3.2 The C source code doesn't have use defined header files.

3.3 The C source code doesn't include pointers.

System Context Diagram



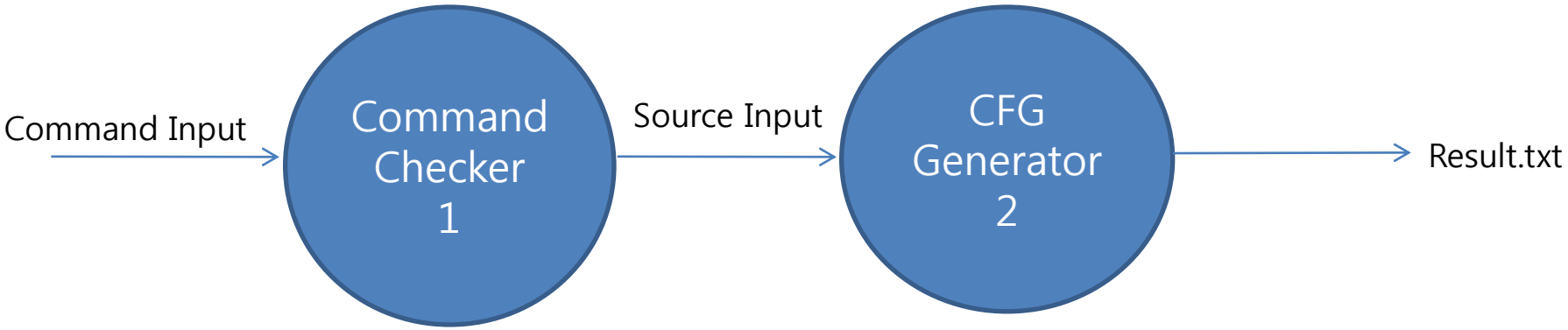
Event List

Input / Output Event	Description
Command Input	Input command that contain result file name and C source file name which converted CFG
Result.txt	Its content is CUI style of CFG showing control flow of input C source file

Behavioral Model

- DFD
- Data Dictionary
- Process Specification

DFD level 0 – CFG Generator



Data Dictionary – DFD level 0

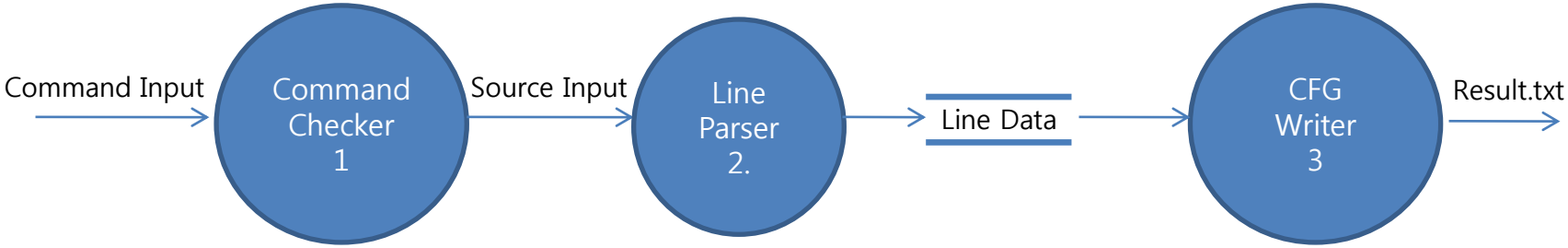
Input / Output Event	Description	format
Command Input	Input command that contain result file name and C source file name which converted CFG	String
Result.txt	Its content is CUI style of CFG showing control flow of input C source file	Text file
Source Input	C source file program convert CFG	C file

Process Specification– DFD level 0

Reference NO.	1
Name	Command Checker
Input	Command Input
Output	Source Input
Process Description	Checking command input syntax. If syntax is not valid, it print help message. And it opens source file and result file. However if these are not opened, it terminate program .

Reference NO.	2
Name	CFG Generator
Input	Source Input
Output	Result.txt
Process Description	Receive source file, it convert source file to CFG

DFD level 1 – CFG Generator



Data Dictionary – DFD level 1

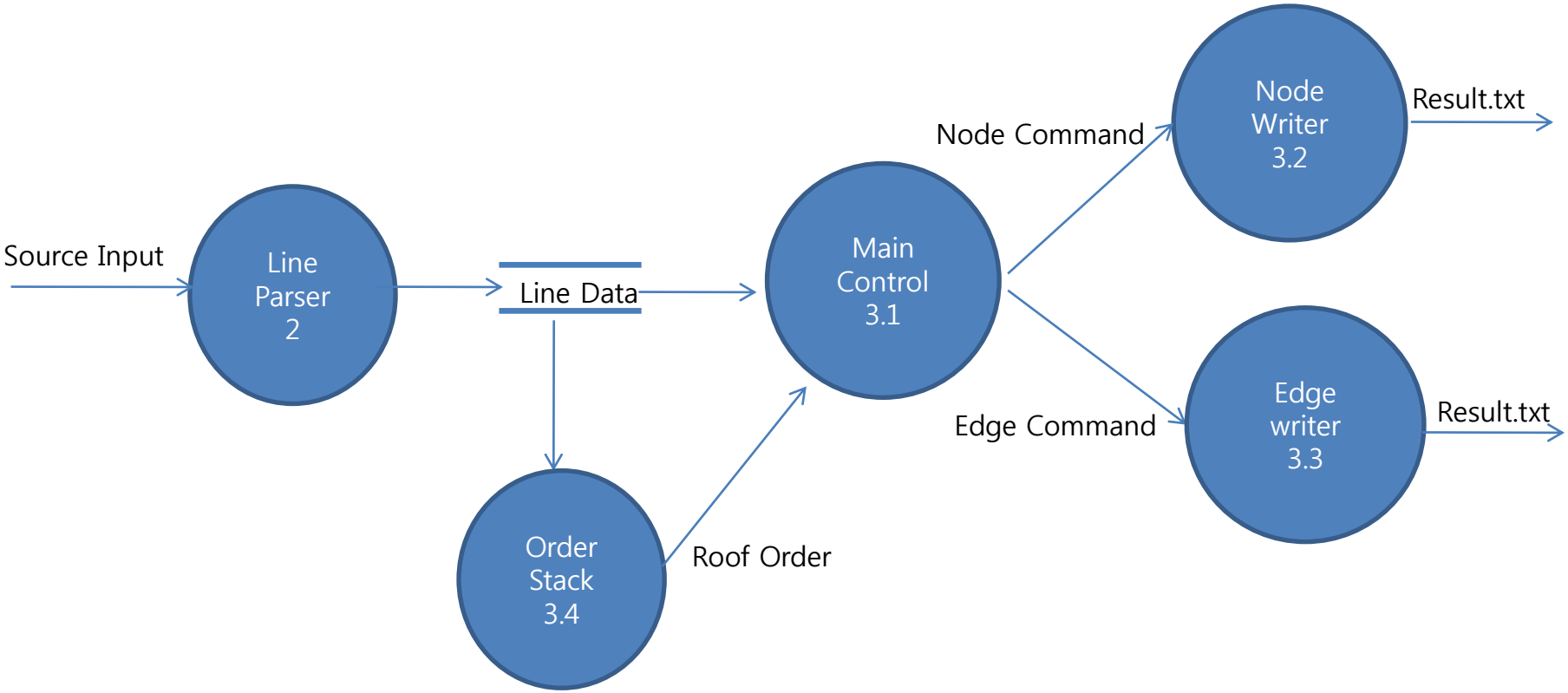
Input / Output Event	Description	Format
Line Data	String Data parsed from C code line in Source file	String

Process Specification– DFD level 1

Reference NO.	2
Name	Line Parser
Input	Source Input
Output	Line Data
Process Description	Get line by line in C source, parse data need to make CFG

Reference NO.	3
Name	CFG Writer
Input	Line Data
Output	Result.txt
Process Description	Receive Line Data, draw CFG corresponding each case

DFD level 2 – CFG Generator



Data Dictionary – DFD level 2

Input / Output Event	Description	Format
Node Command	IsRoof	boolean
Edge Command	None, If, For, While, Switch	Integer
Roof Order	None, If, For, While, Switch	Integer

Process Specification– DFD level 2

Reference NO.	3.1
Name	Main Control
Input	Line Data, Roof Order
Output	Node Command, Edge Command
Process Description	Interpret input, determine what process is activated

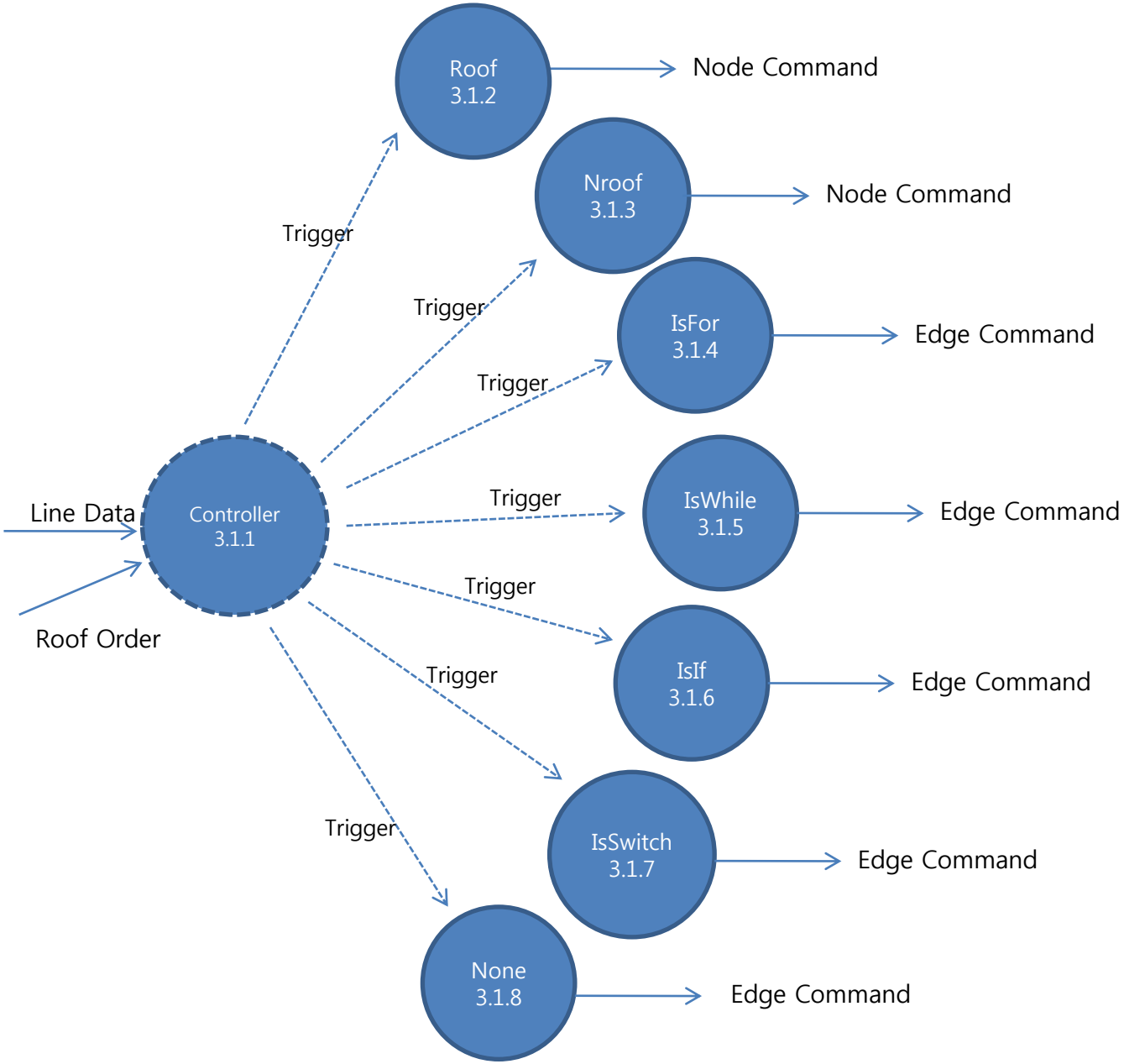
Reference NO.	3.2
Name	Node Writer
Input	Node Command
Output	Result.txt
Process Description	Draw node line to result file corresponding each case

Process Specification– DFD level 2

Reference NO.	3.3
Name	Edge Writer
Input	Edge Command
Output	Result.txt
Process Description	Draw edge to result file corresponding each case

Reference NO.	3.4
Name	Order Stack
Input	Line Data
Output	Roof Order
Process Description	Determine what roof is drown at first

DFD level 3 – CFG Generator



Process Specification– DFD level 3

Reference NO.	3.1.1
Name	Controller
Input	Line Data, Roof Order
Output	Trigger
Process Description	Interpret input, determine what process is activated

Reference NO.	3.1.2
Name	Roof
Input	Trigger
Output	Node Command
Process Description	Send command to Node Writer to draw CFG in specific way

Process Specification– DFD level 3

Reference NO.	3.1.3
Name	Nroof
Input	Trigger
Output	Node Command
Process Description	Send command to Node Writer to draw source code line

Reference NO.	3.1.4
Name	IsFor
Input	Trigger
Output	Edge Command
Process Description	Send command to Edge Writer to draw For edge

Process Specification– DFD level 3

Reference NO.	3.1.5
Name	IsWhile
Input	Trigger
Output	Edge Command
Process Description	Send command to Edge Writer to draw While edge

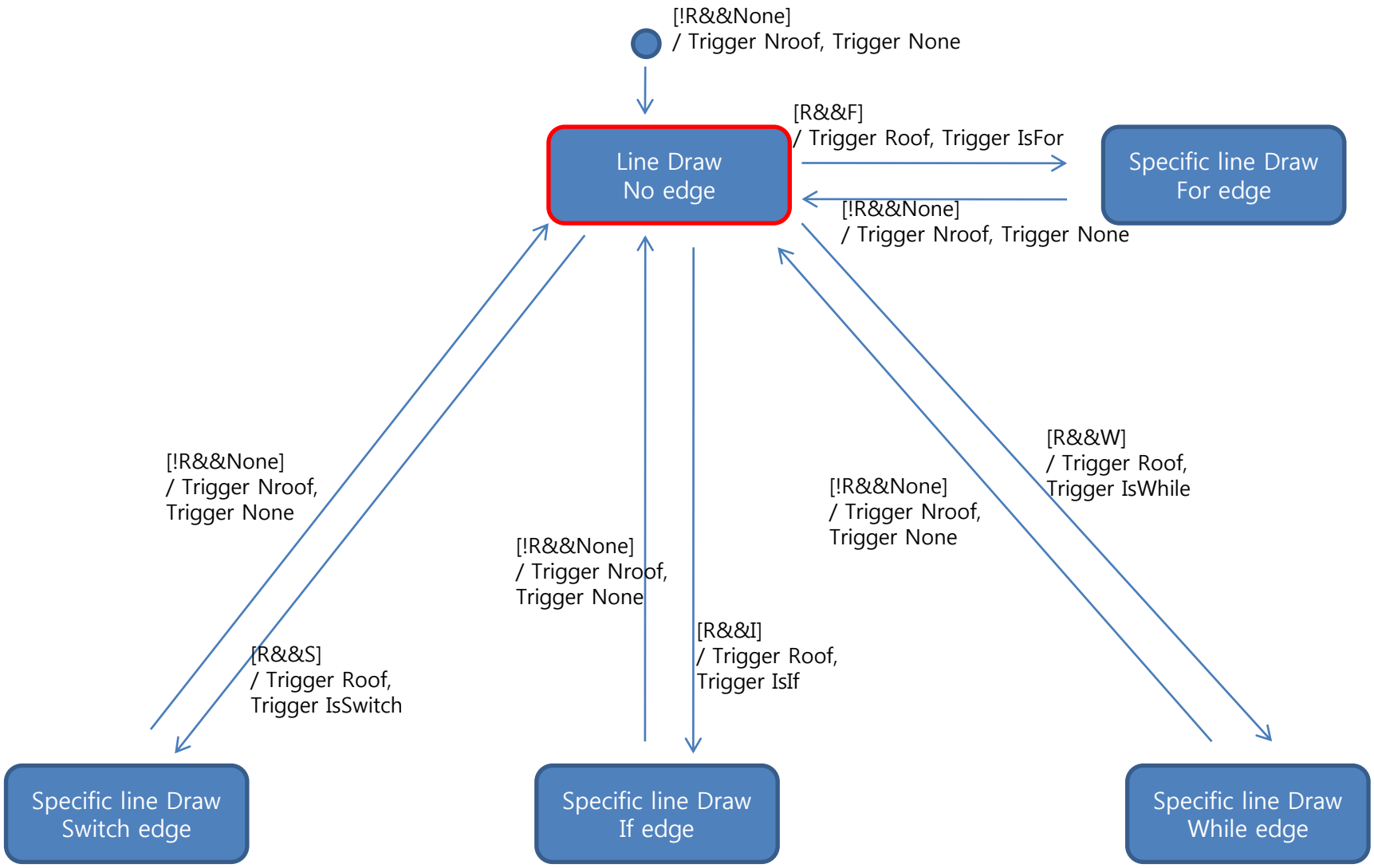
Reference NO.	3.1.6
Name	IsIf
Input	Trigger
Output	Edge Command
Process Description	Send command to Edge Writer to draw If edge

Process Specification– DFD level 3

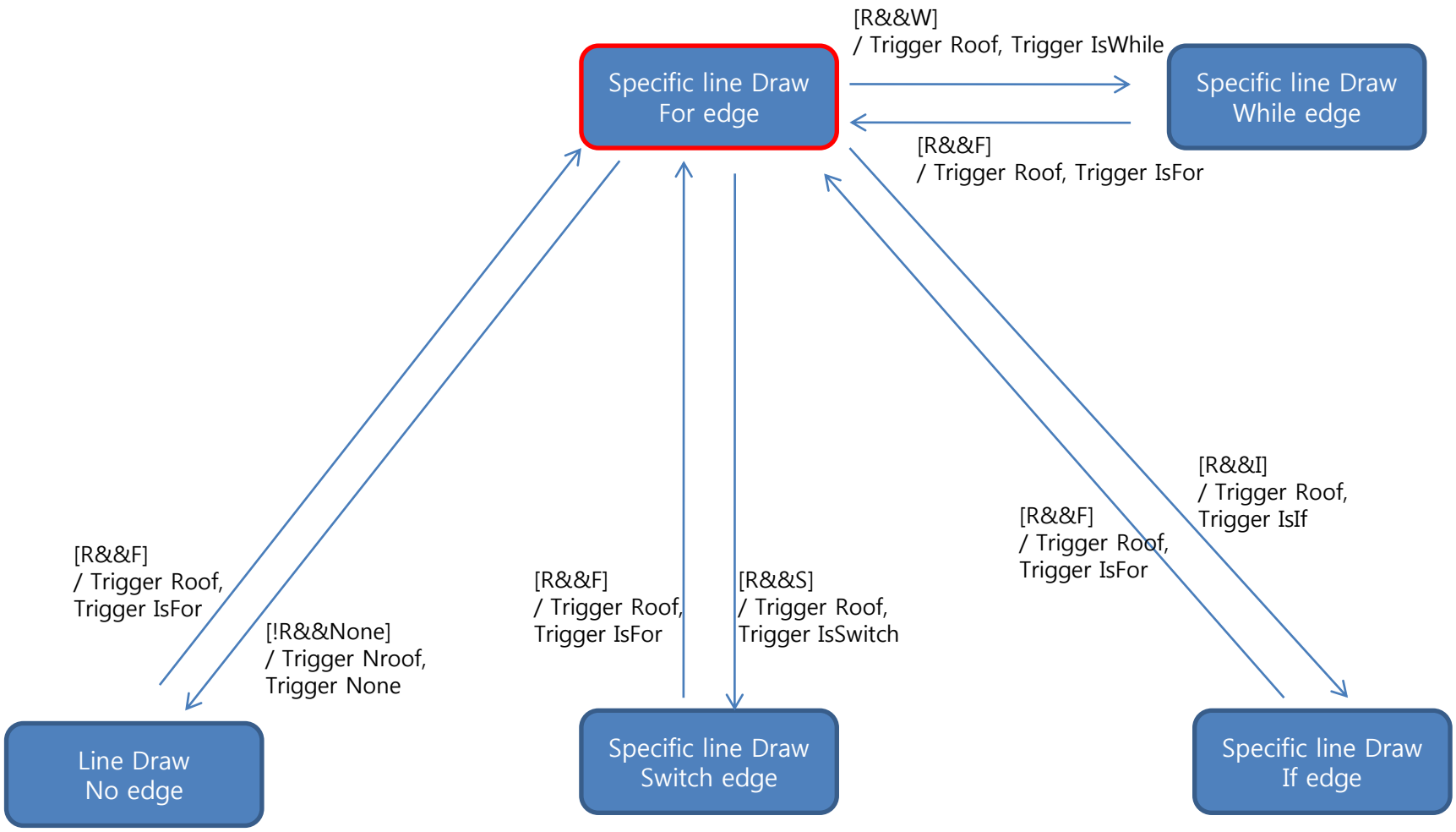
Reference NO.	3.1.7
Name	IsSwitch
Input	Trigger
Output	Edge Command
Process Description	Send command to Edge Writer to draw Switch edge

Reference NO.	3.1.8
Name	None
Input	Trigger
Output	Edge Command
Process Description	Send command to Edge Writer to draw nothing

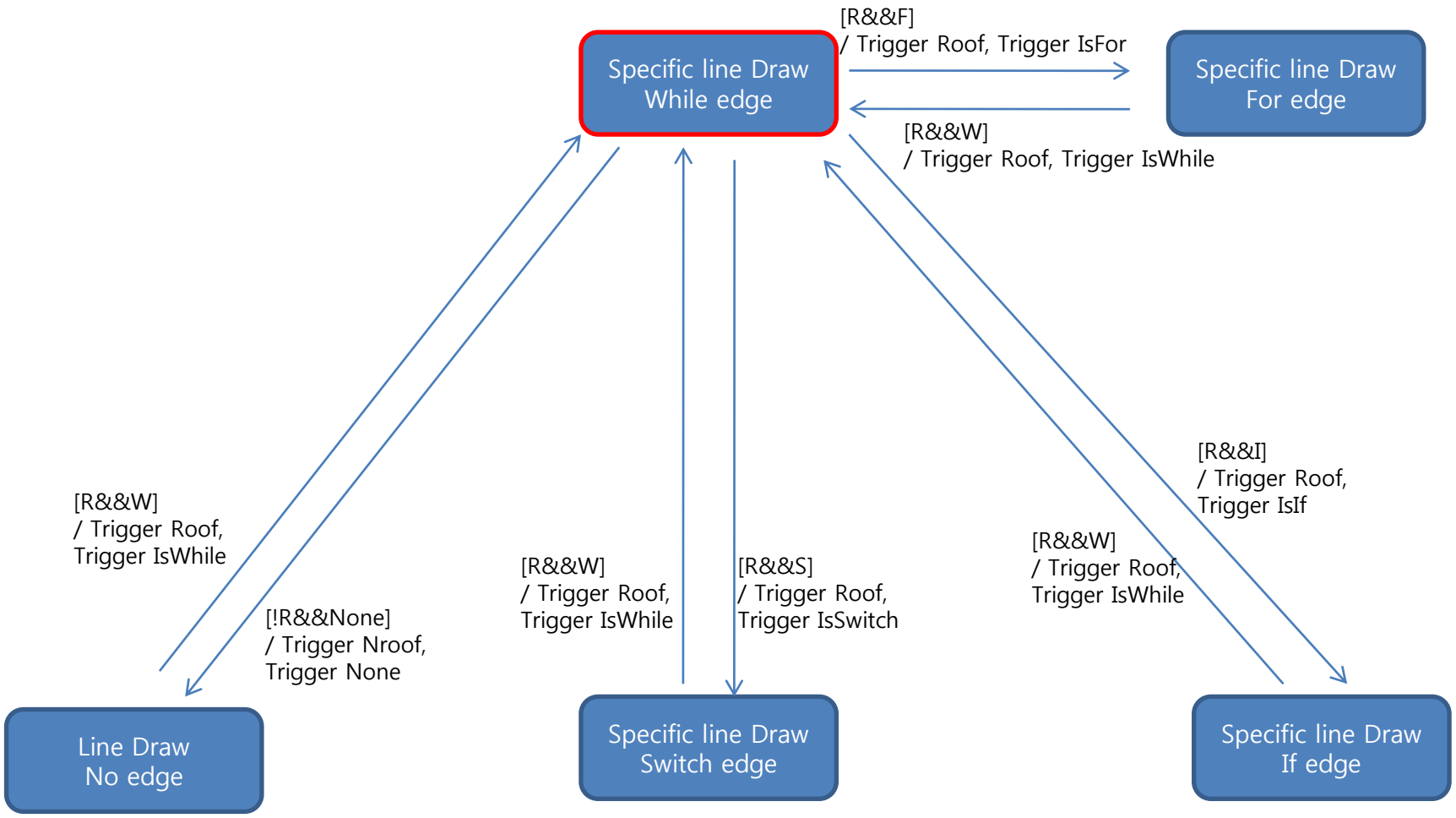
DFD level 4 – CFG Generator



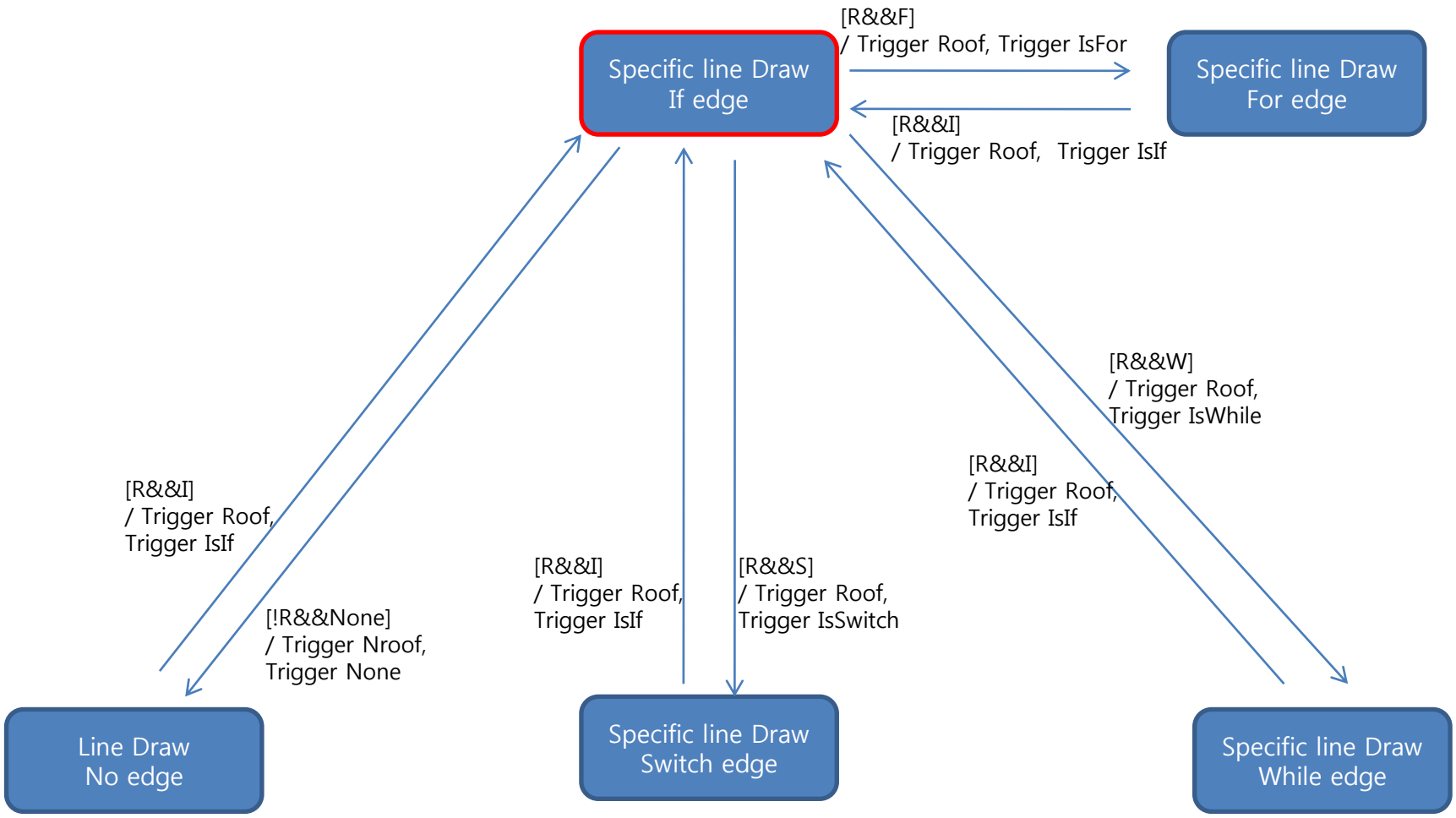
DFD level 4 – CFG Generator



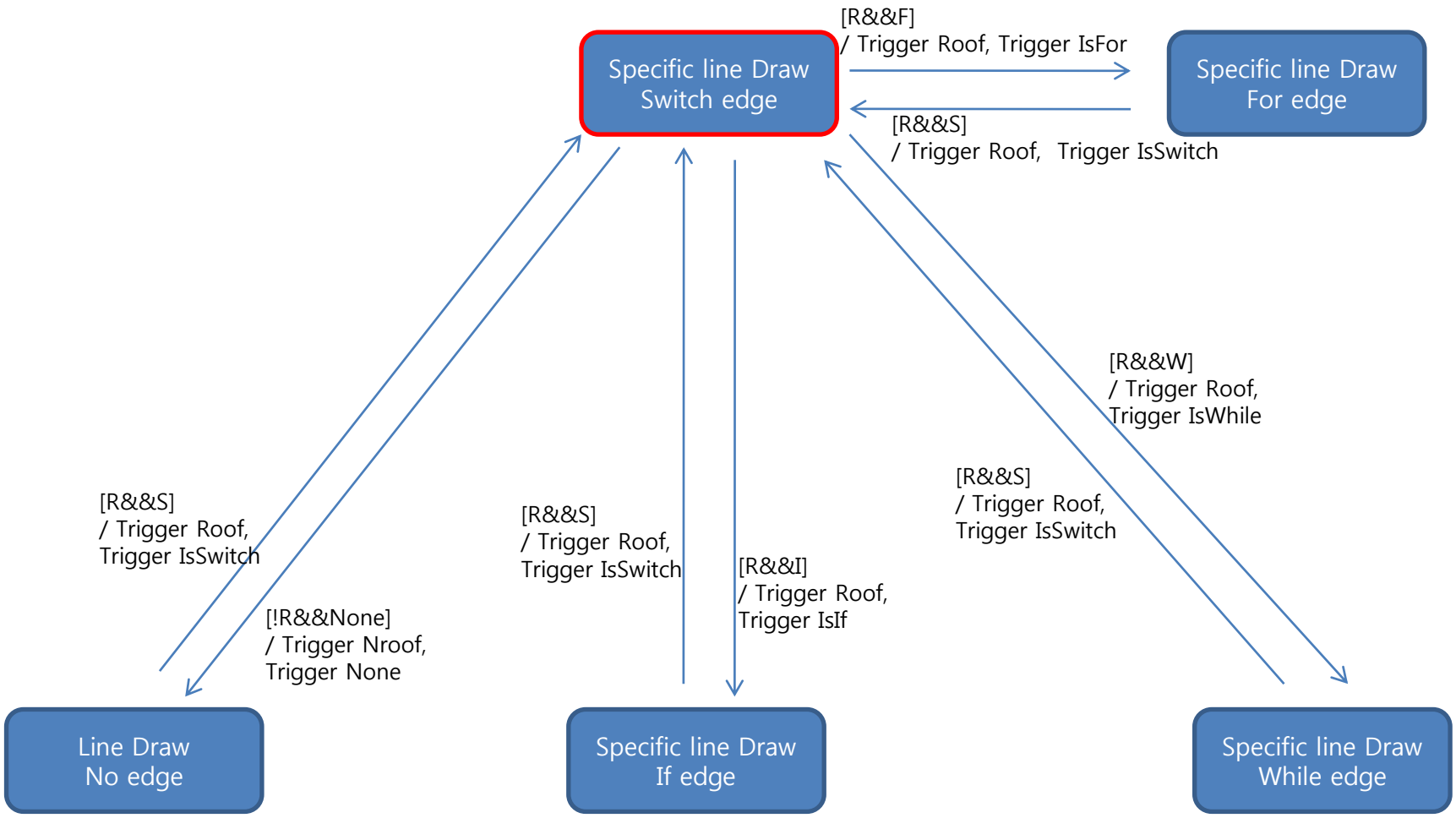
DFD level 4 – CFG Generator



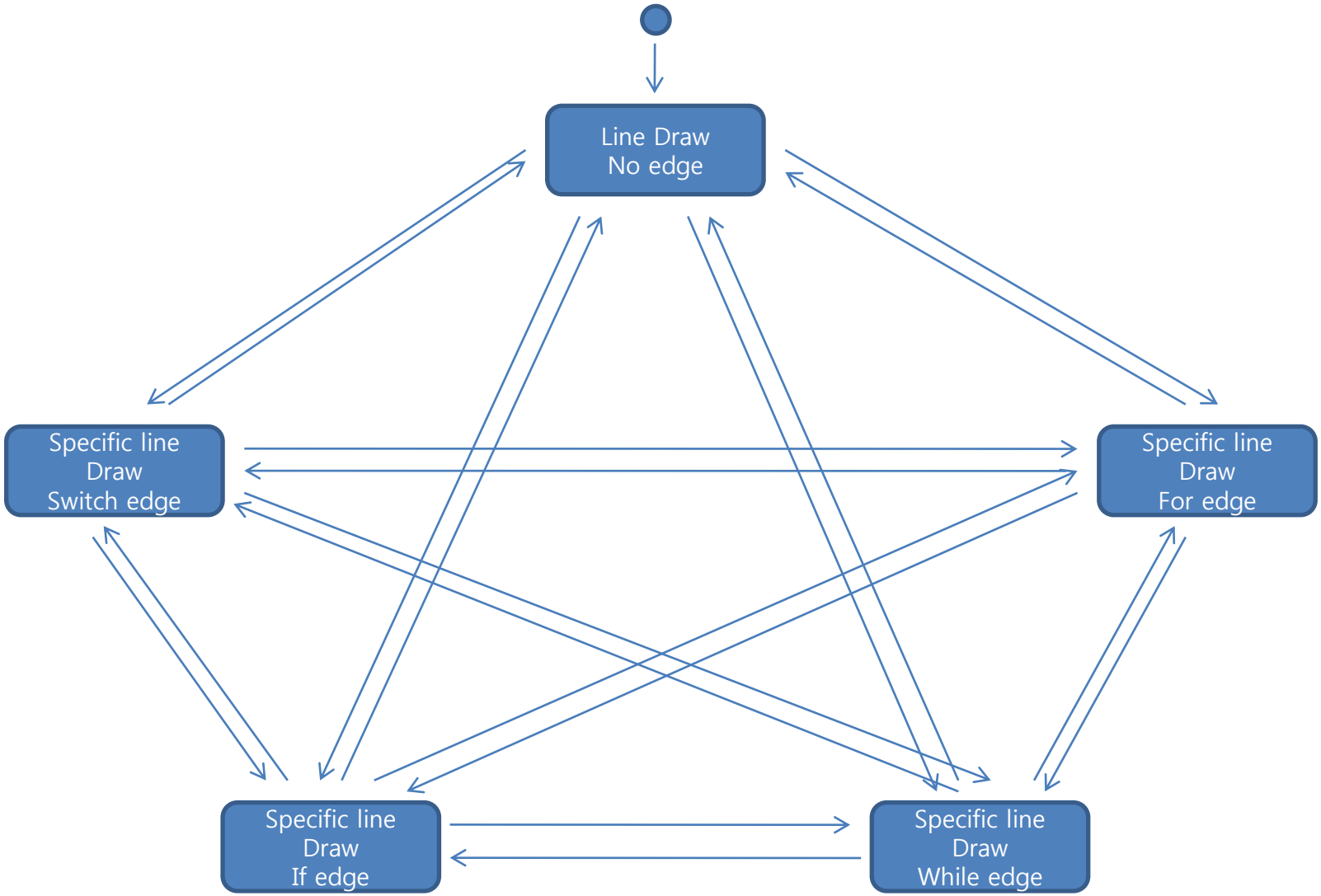
DFD level 4 – CFG Generator



DFD level 4 – CFG Generator



DFD level 4 Overview– CFG Generator



DFD Overview – CFG Generator