Final Presentation

CFG Generator with SASD

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Contents

Change in SASD

Code from the SASD

Demonstration

Changes in SASD

Statement of Purpose

Not Changed !!!

System Context Diagram

& Event List

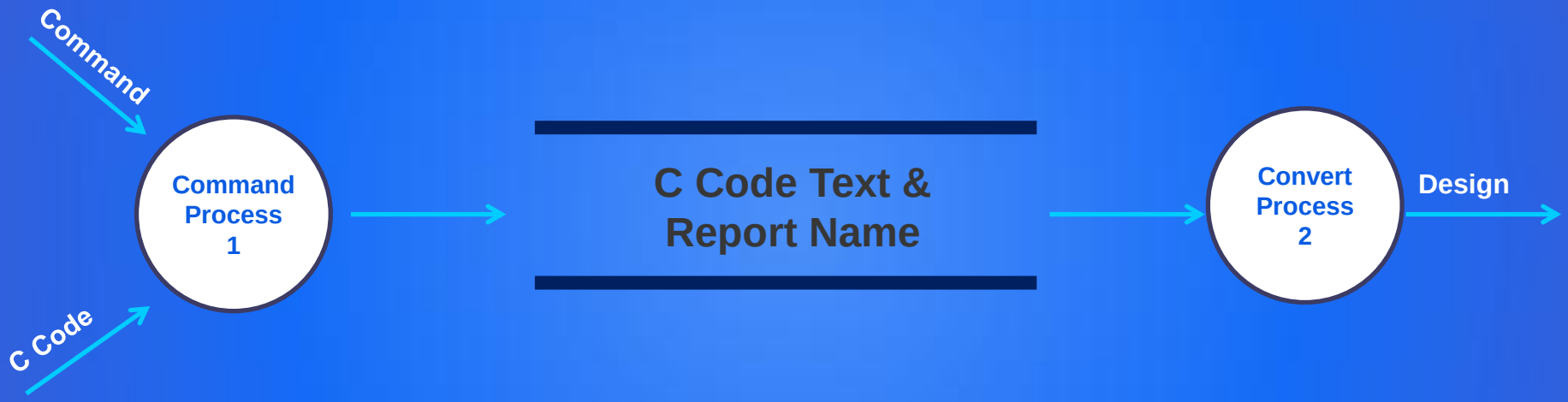
Input / Output Event	Description
Command	CUI Command 를 입력 받는다.
Design	Convert 된 Design 을 넘겨 준다.

Input/Output Event	Description	Format/Type
Command	String that includes Input File Name and Output File Name Ex) ./CG [input file name] [output file name]	char*
C Code	C code that will convert CFG C code must have *.c file extension C code Generated by C standard	*.c
Design	Data that saves information for drawing CFG and a information to create report file struct Design{ int nodesize; int edgesize; Node* node[DESIGN_SIZE]; Edge* edge[DESIGN_SIZE*2];}	struct

Data Flow Diagram

DFD Level 1

Changes in SASD



Char* Report Name - OK
[.txt] Text File ..???

Changes in SASD

Char* Report Name - OK
File* File Pointer !

DFD Level 2

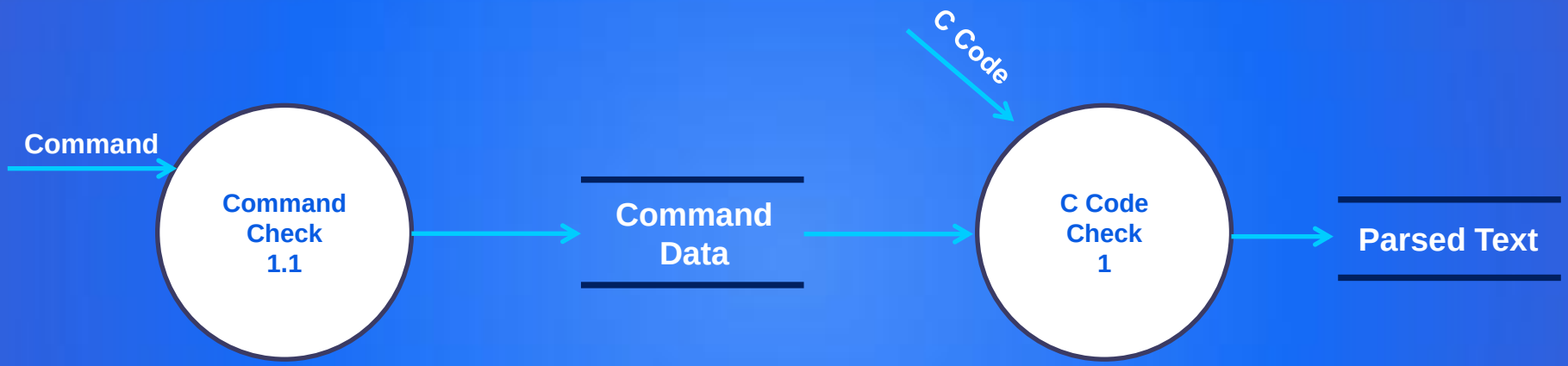
Changes in SASD

[Command Check] don't use [C Code]

One data flow with two data

Changes in SASD

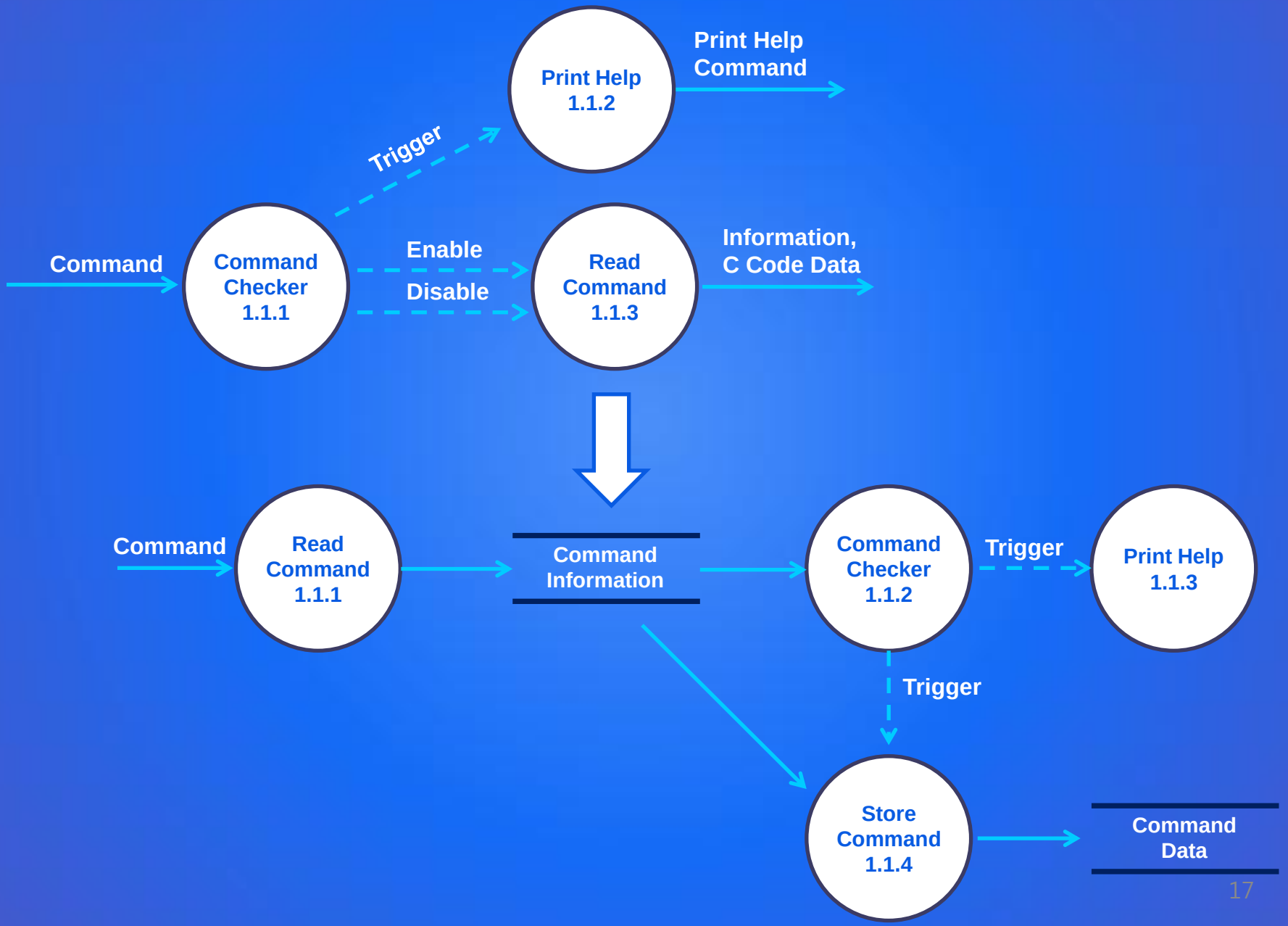
[C Code Check] use [C Code]



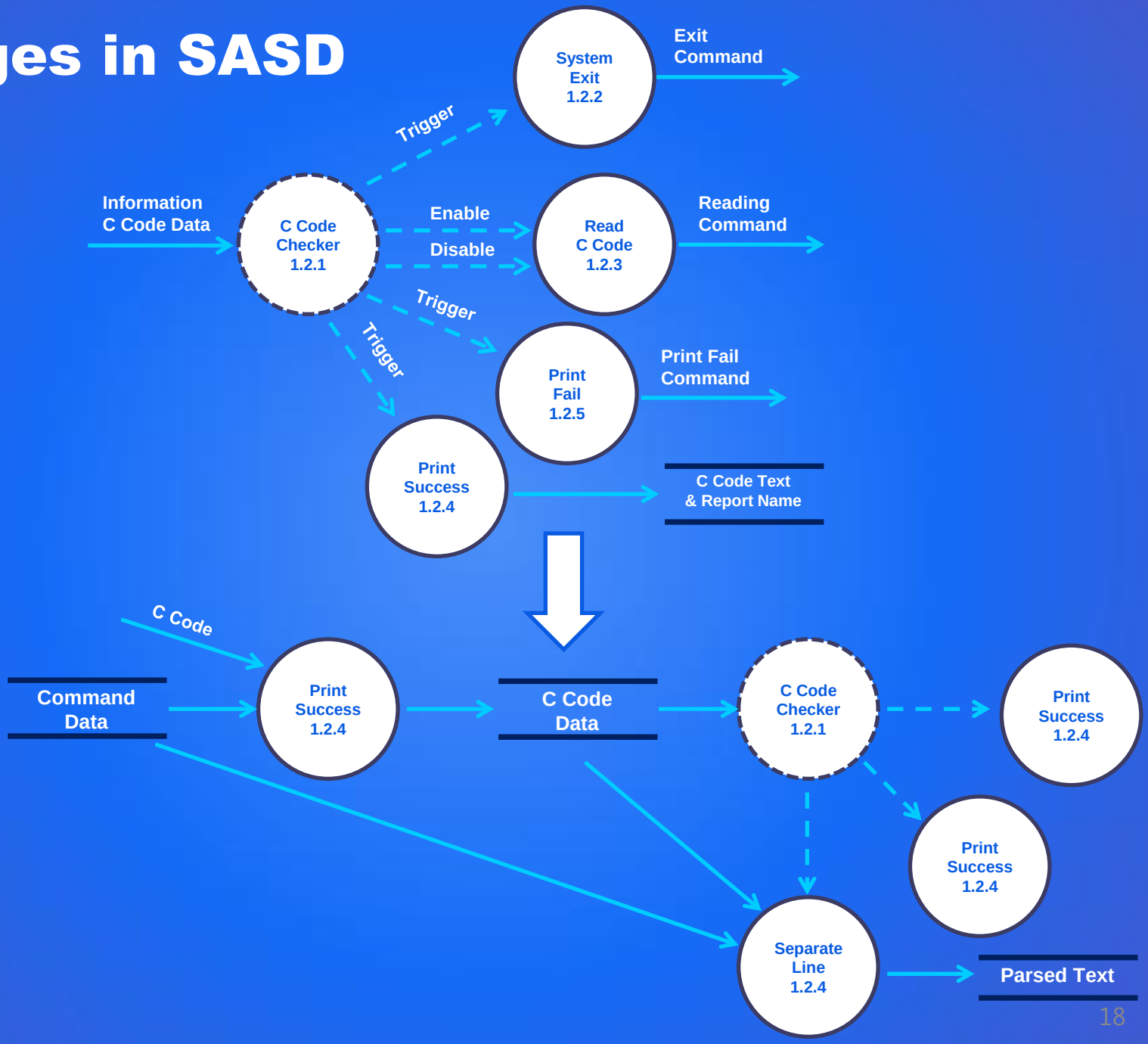
Make Data store

DFD Level 3

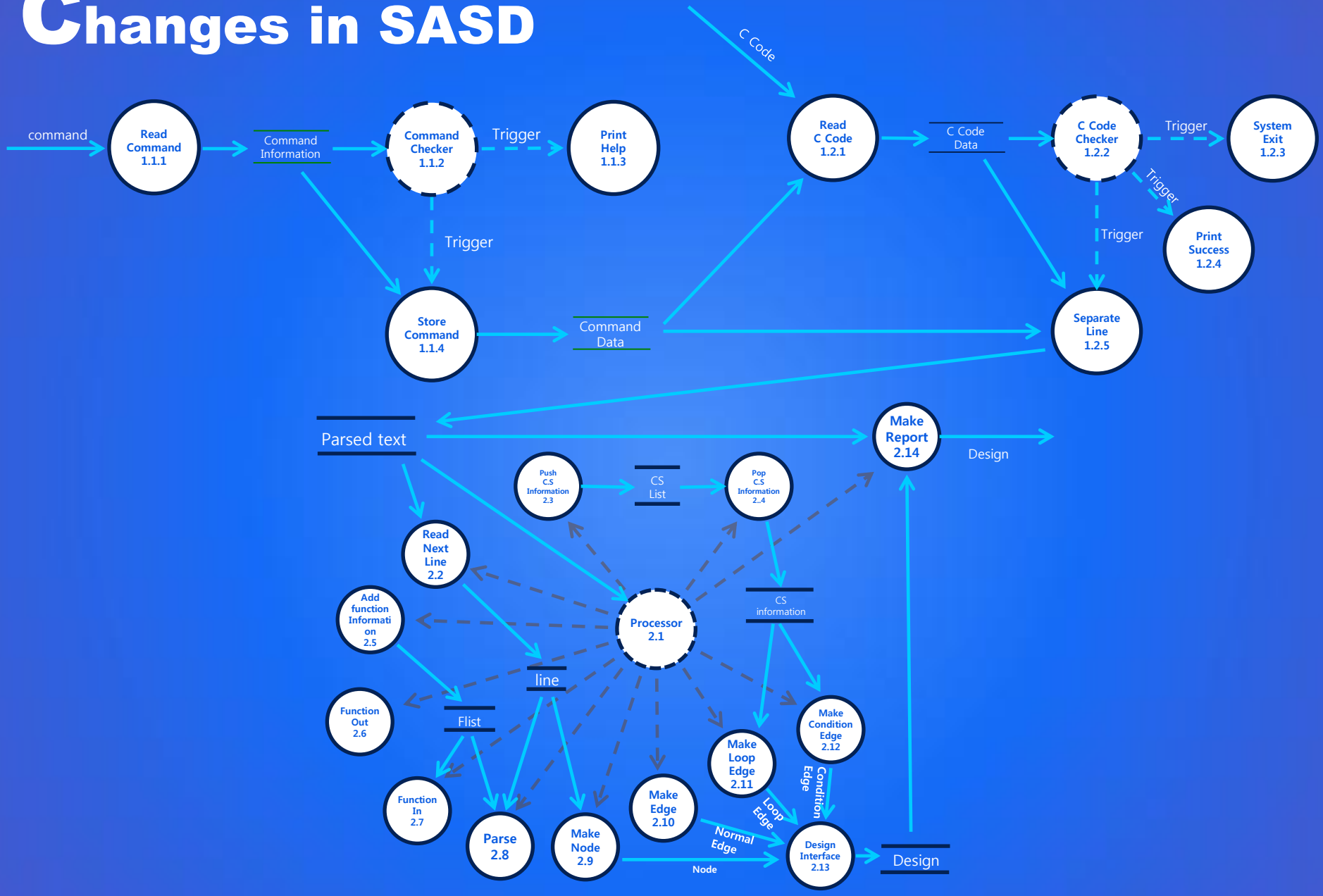
Changes in SASD



Changes in SASD

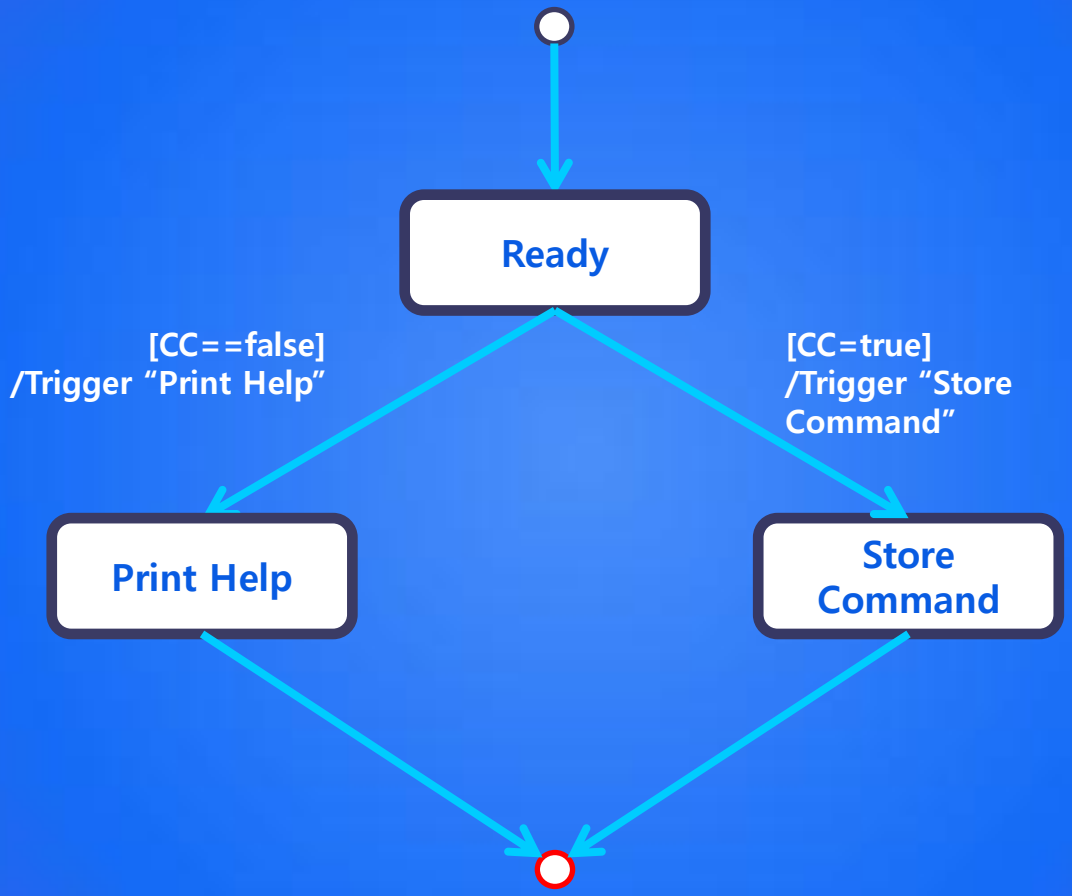


Changes in SASD

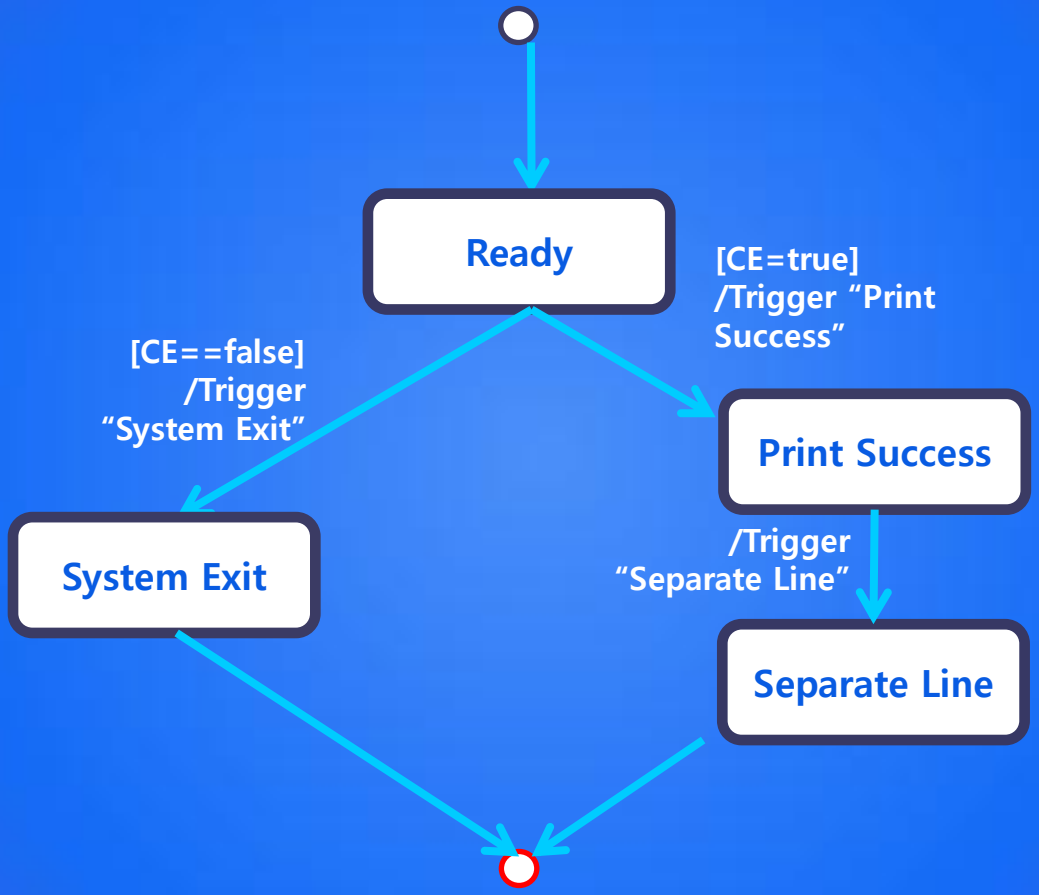


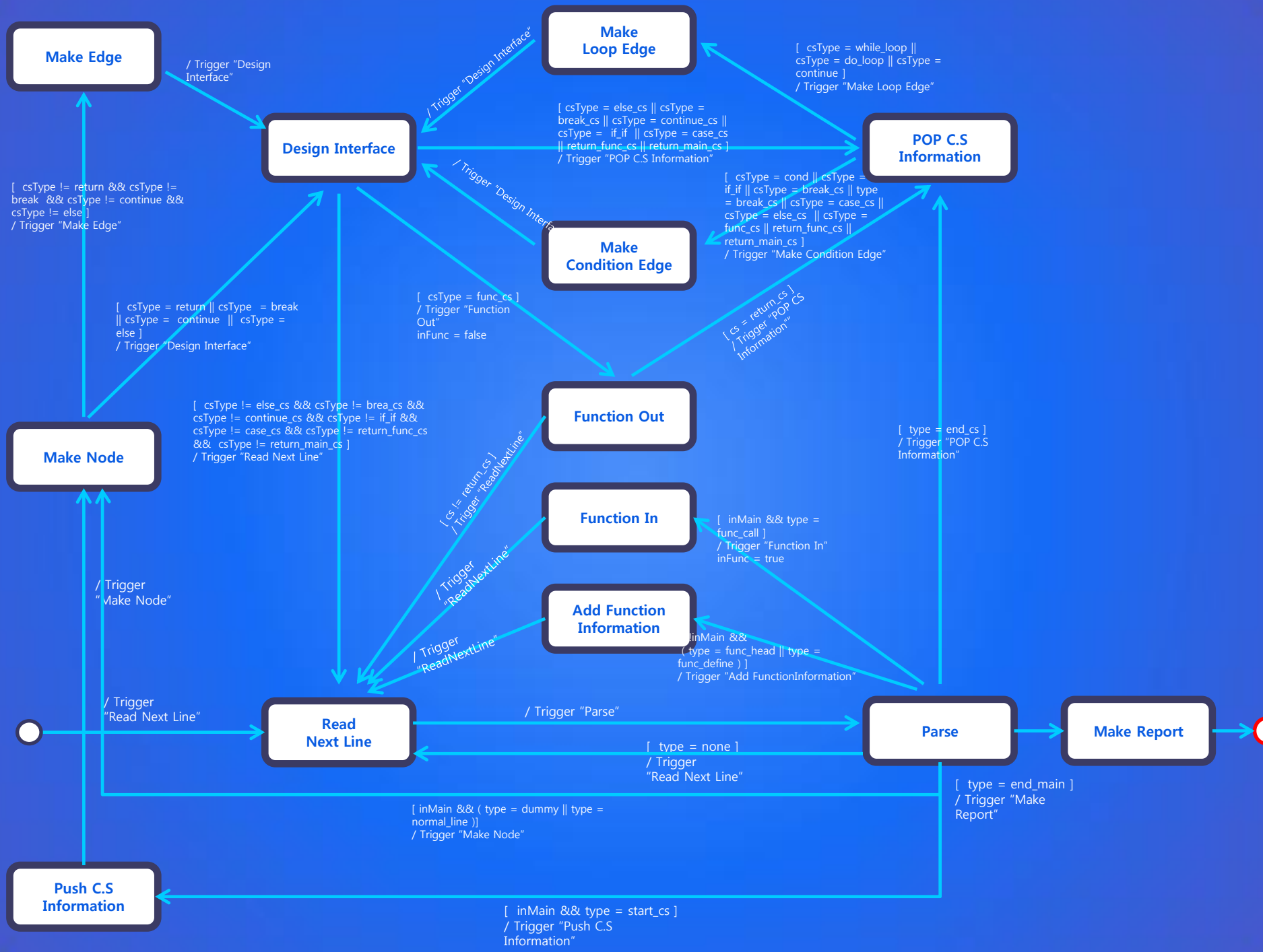
Finite State Machine

Changes in SASD



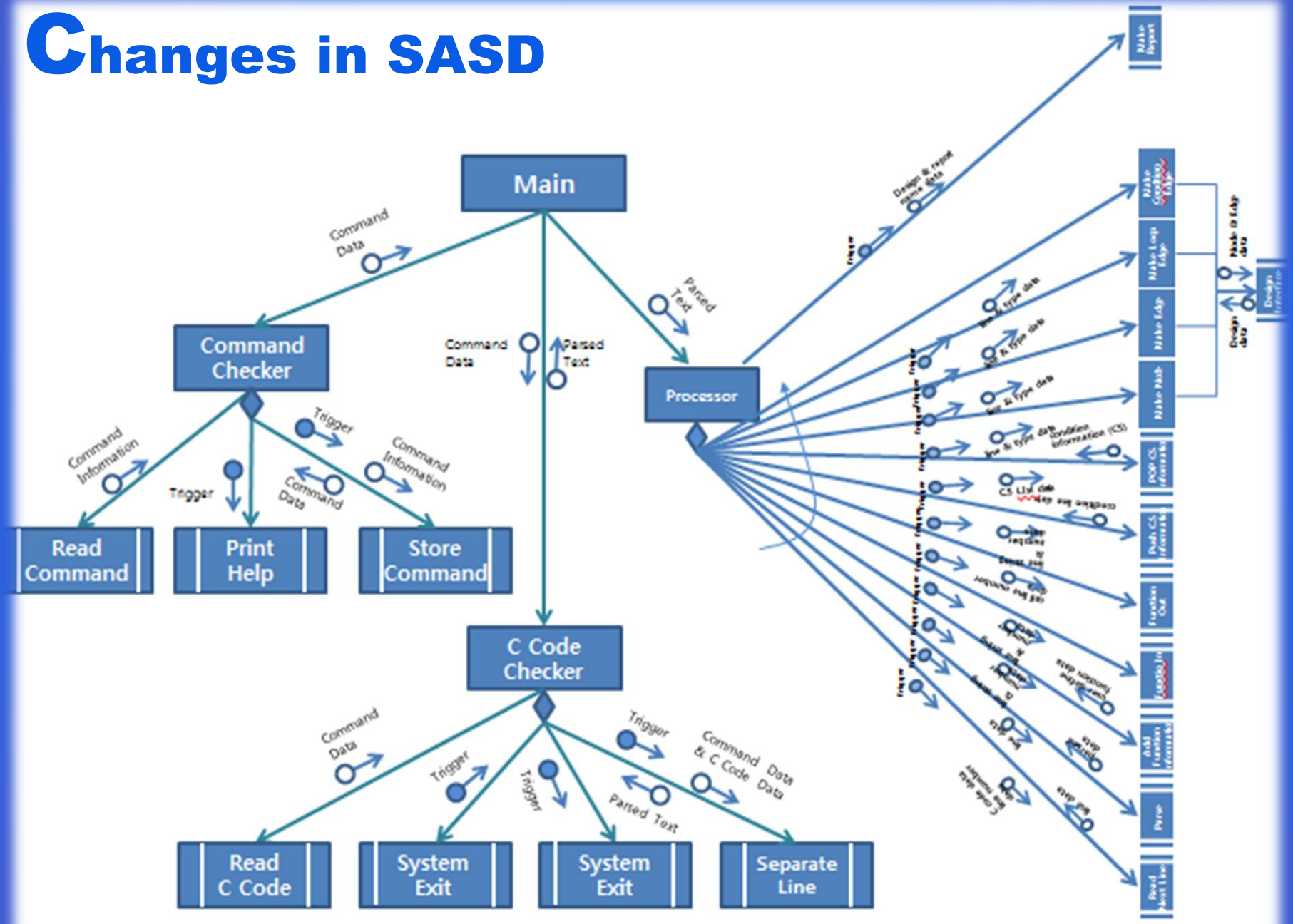
Changes in SASD




Make Edge
/ Trigger "Design Interface"
Make Loop Edge
/ Trigger "Design Interface"
[csType = while_loop || csType = do_loop || csType = continue]
/ Trigger "Make Loop Edge"
Design Interface
[csType = else_cs || csType = break_cs || csType = continue_cs || csType = if_if || csType = case_cs || return_func_cs || return_main_cs]
/ Trigger "POP C.S Information"
POP C.S Information
[csType != return && csType != break && csType != continue && csType != else]
/ Trigger "Make Edge"
/ Trigger "Design Interface"
Make Condition Edge
[csType = cond || csType = if_if || csType = break_cs || type = break_cs || csType = case_cs || csType = else_cs || csType = func_cs || return_func_cs || return_main_cs]
/ Trigger "Make Condition Edge"
[csType = return || csType = break || csType = continue || csType = else]
/ Trigger "Design Interface"
[csType = func_cs]
/ Trigger "Function Out"
inFunc = false
[cs = return_cs]
/ Trigger "POP CS Information""
Function Out
[csType != else_cs && csType != brea_cs && csType != continue_cs && csType != if_if && csType != case_cs && csType != return_func_cs && csType != return_main_cs]
/ Trigger "Read Next Line"
Make Node
[type = end_cs]
/ Trigger "POP C.S Information"
[cs != return_cs]
/ Trigger "ReadNextLine"
Function In
[inMain && type = func_call]
/ Trigger "Function In"
inFunc = true
/ Trigger "Make Node"
/ Trigger "ReadNextLine"
Add Function Information
/ Trigger "ReadNextLine"
[inMain && (type = func_head || type = func_define)]
/ Trigger "Add FunctionInformation"
/ Trigger "Read Next Line"
Read Next Line
/ Trigger "Parse"
Parse
Make Report
[type = none]
/ Trigger "Read Next Line"
[type = end_main]
/ Trigger "Make Report"
[inMain && (type = dummy || type = normal_line)]
/ Trigger "Make Node"
Push C.S Information
[inMain && type = start_cs]
/ Trigger "Push C.S Information"

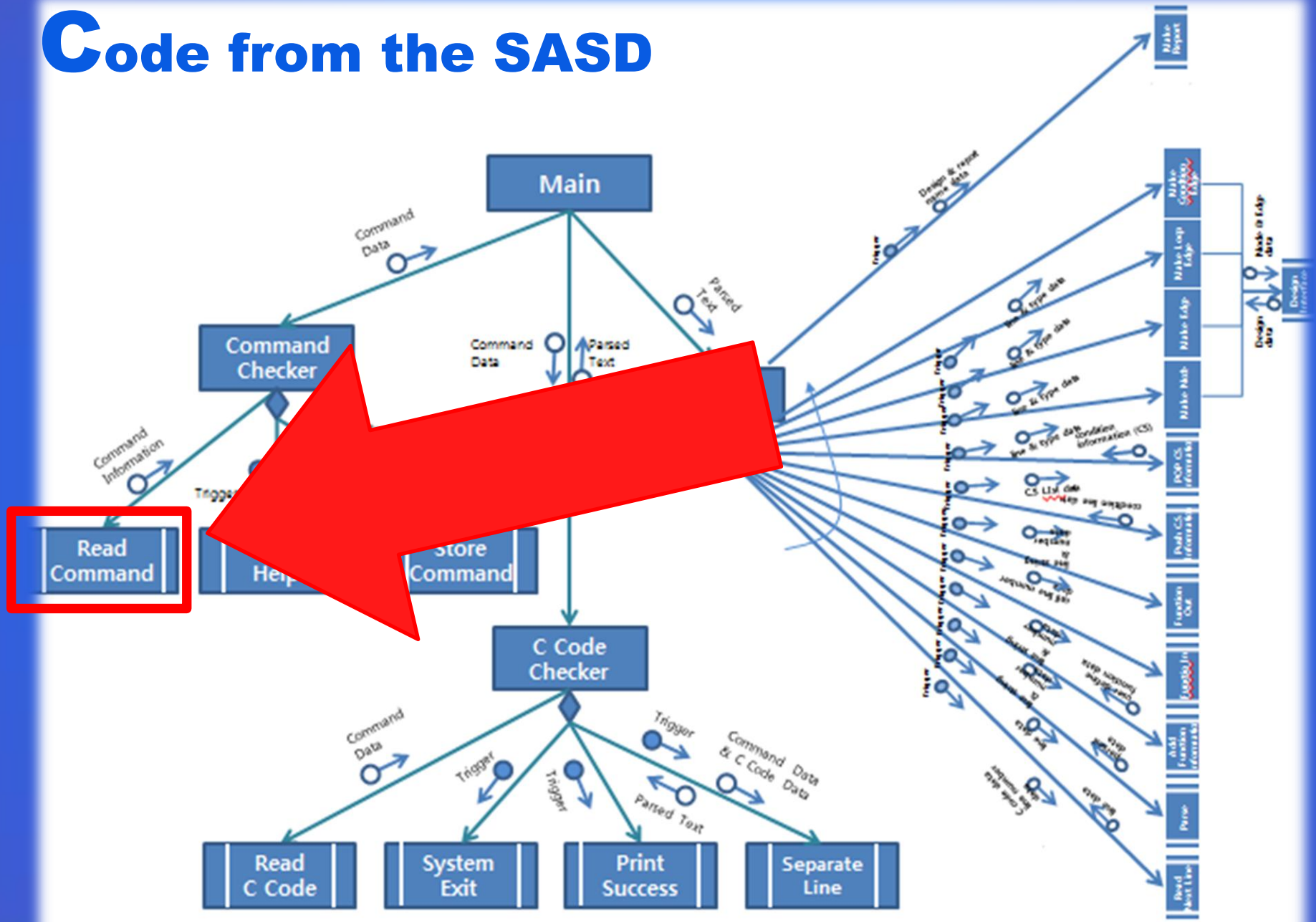
Structured Chart

Changes in SASD



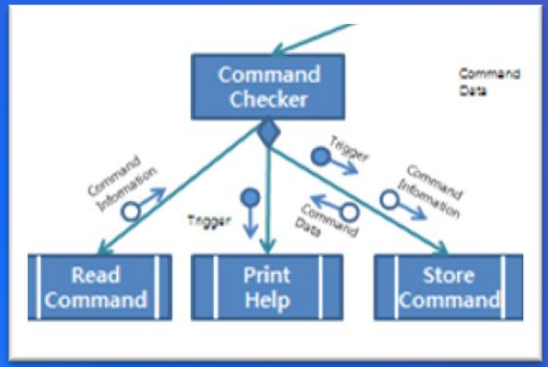
Code form the SASD

Code from the SASD



Code from the SASD

Read Command

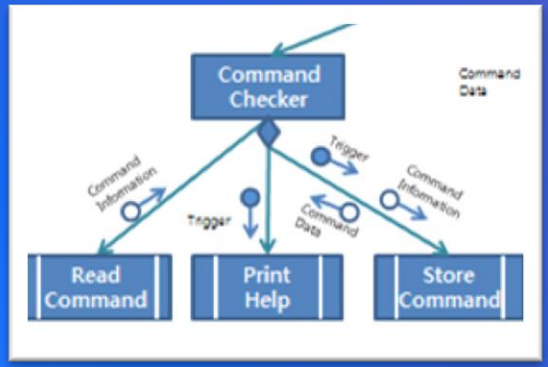



```
int main(int argc, char **argv)
{
    CommandInfo* cmdInfo;
    CommandData* cmdData;

    CCodeData* ccData;
    ParsedText* parsedData;


    cmdInfo = ReadCommand(argc,(char*)argv[1],(char*)argv[2]);

    cmdData = CommandChecker(cmdInfo);

    ccData = ReadCCode(cmdData);


    parsedData = CCodeChecker(cmdData,ccData);

    return 0;
}
```

Input Data is entering ReadCommand function in main

Code from the SASD

Read Command




```
#ifdef _DEBUG
    puts("#ReadCommand called");
#endif
```

If argument count is 3

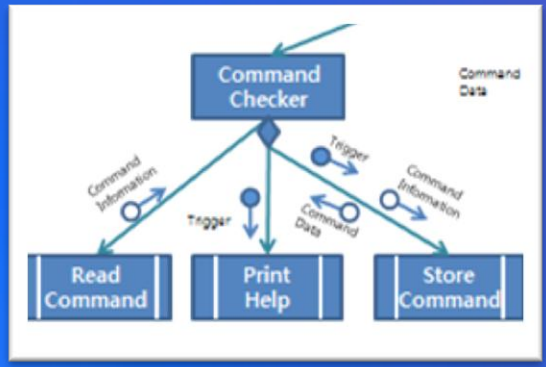
```
    if ( argc == 3){
        cmdInfo->hasError = TRUE;
        cmdInfo->inputFileName = argv1;
        cmdInfo->reportFileName = argv2;
```

If argument count is 2

```
    }else if(argc == 2)
    {
        char* buf = (char*)malloc(sizeof(char)*FILENAME_BUF);
        int index,it;

        index = 0;   it = 0;
        cmdInfo->hasError = TRUE;
        cmdInfo->inputFileName = argv1;

        strcpy(buf,argv1);
        strcat(buf,".report.txt");
        cmdInfo->reportFileName = buf;

    }else
```

Code from the SASD

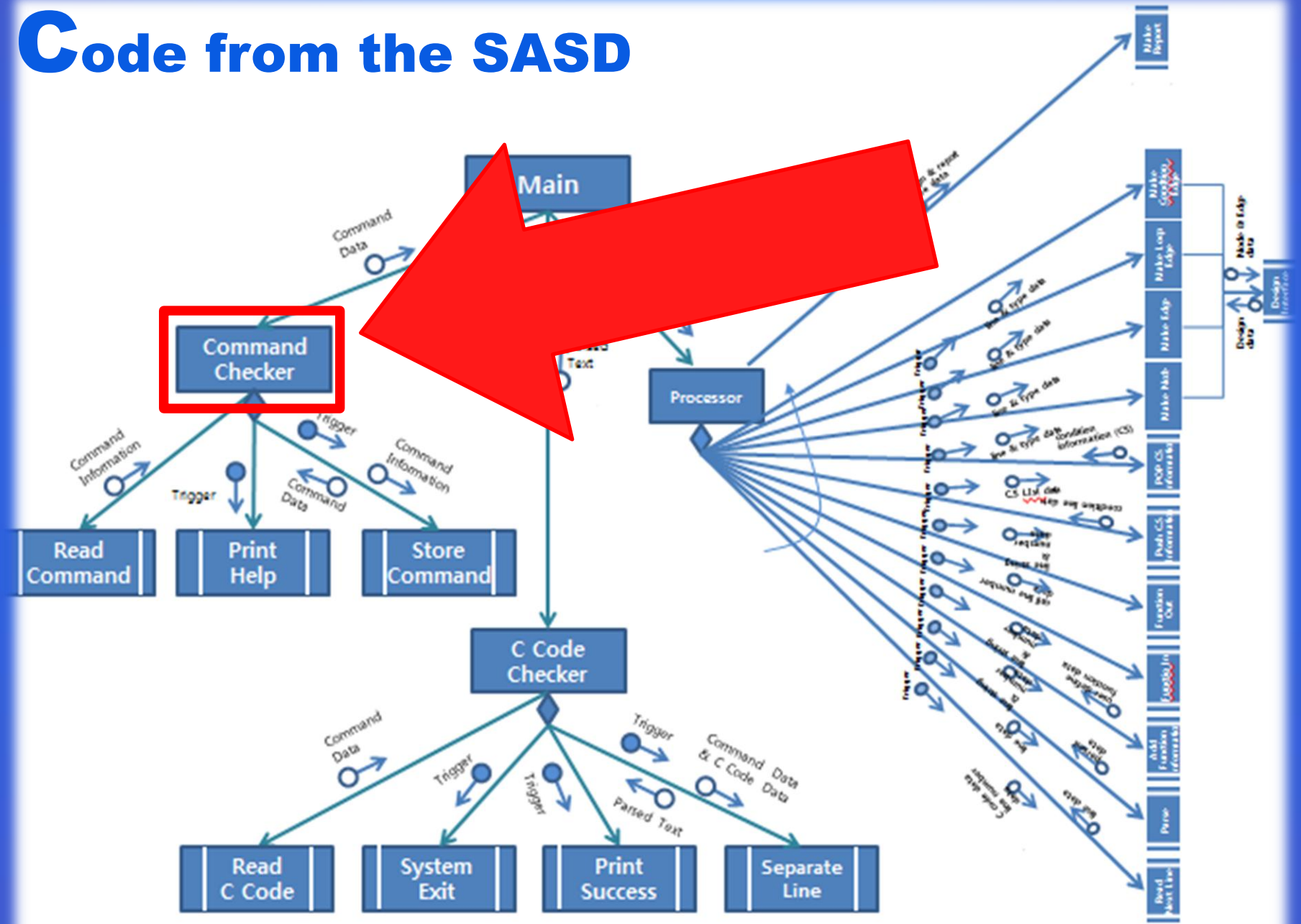
Read Command




```
        cmdInfo->hasError = TRUE;
        cmdInfo->inputFileName = argv1;

        strcpy(buf,argv1);
        strcat(buf,".report.txt");
        cmdInfo->reportFileName = buf;

    }else
    {
        return cmdInfo;
    }

#ifdef _DEBUG
        printf(" >argc:%d¥n >argv1:%s¥n >argv2:%s¥n", argc,argv1,argv2);
#endif

    return cmdInfo;
}
```

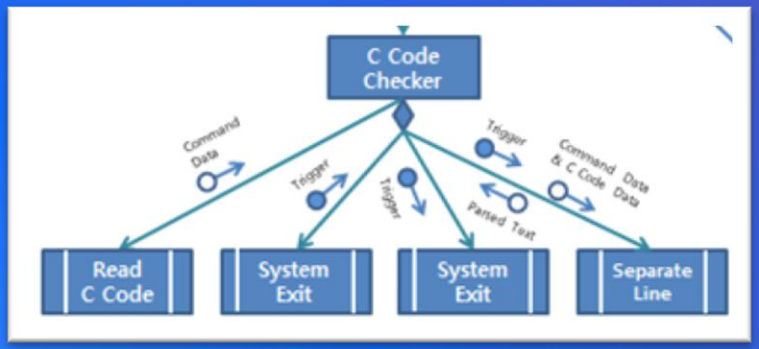
In the other case

Code from the SASD



Code from the SASD

Read C Code

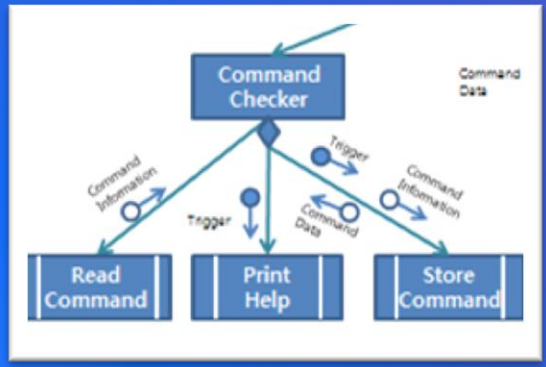



```
int main(int argc, char **argv)
{
    CommandInfo* cmdInfo;
    CommandData* cmdData;

    CCodeData* ccData;
    ParsedText* parsedData;



    cmdInfo = ReadCommand(argc,(char*)argv[1],(char*)argv[2]);

    cmdData = CommandChecker(cmdInfo);

    ccData = ReadCCode(cmdData);


    parsedData = CCodeChecker(cmdData,ccData);
```

Command Checker take command information from main function

Code from the SASD

Command Checker

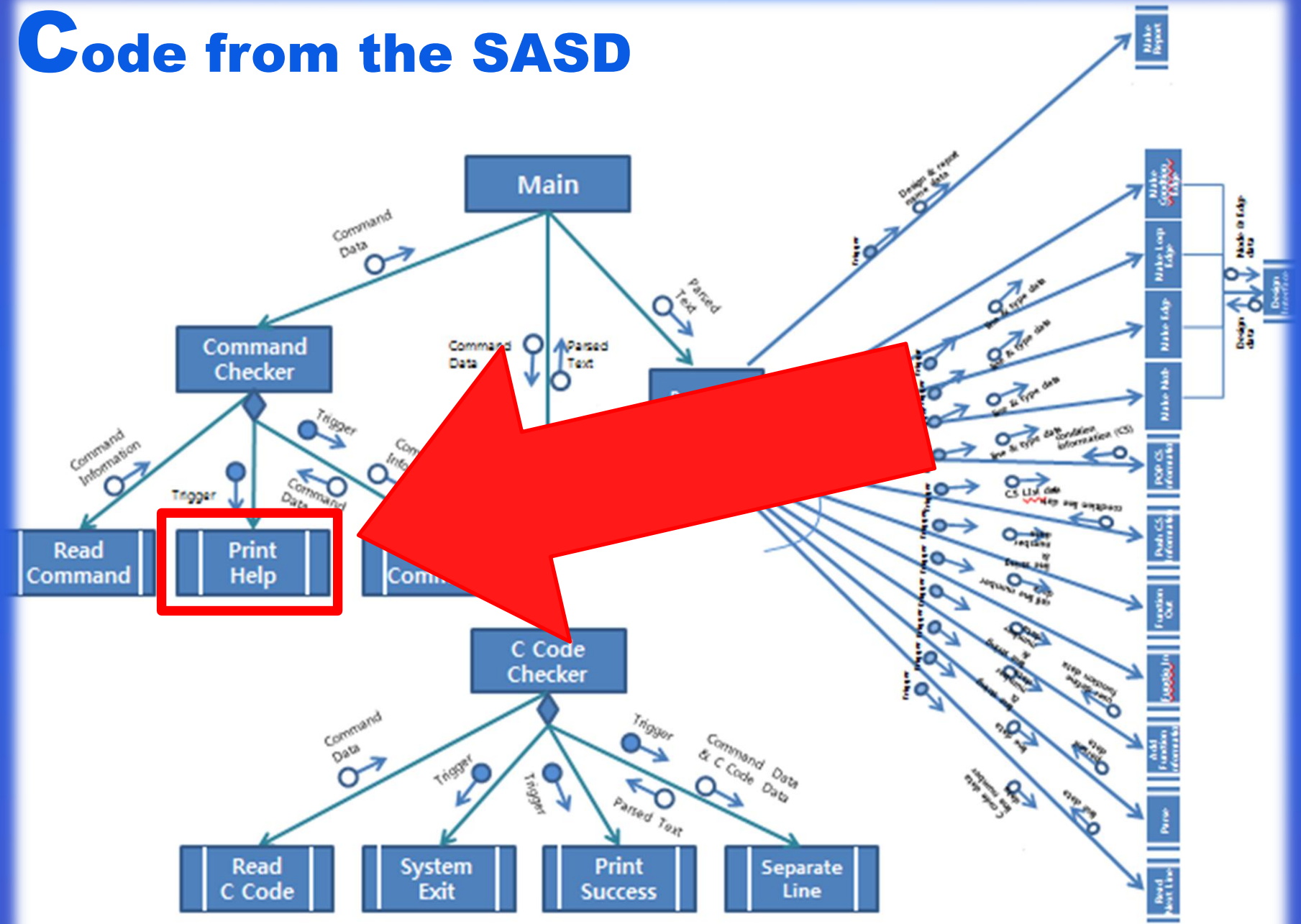



```
CommandData* CommandChecker(CommandInfo* cmdInfo)
{

    CommandData* tmp = StoreCommand(cmdInfo);
#ifdef _DEBUG
    puts("#CommandChecker called");
    printf(" >CommandChecker!₩n >inputFileName:%s₩n >outputFileName:%s₩n",cmdInfo->
inputFileName,cmdInfo->reportFileName);
#endif

    switch(cmdInfo->hasError)
    {
        case TRUE:
            return StoreCommand(cmdInfo);

        case FALSE:
            PrintHelp();
    }
        return NULL;
}
```

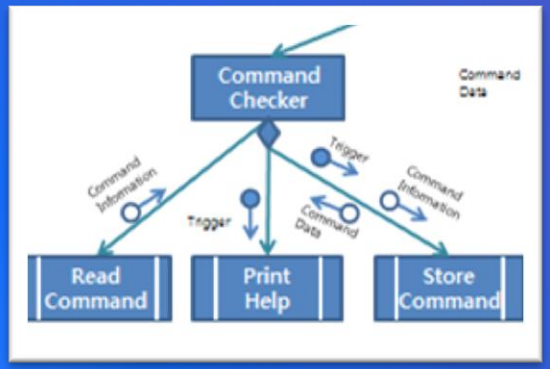
Command Checker detect command error

When command error occurred

Code from the SASD



Code from the SASD



Print Help

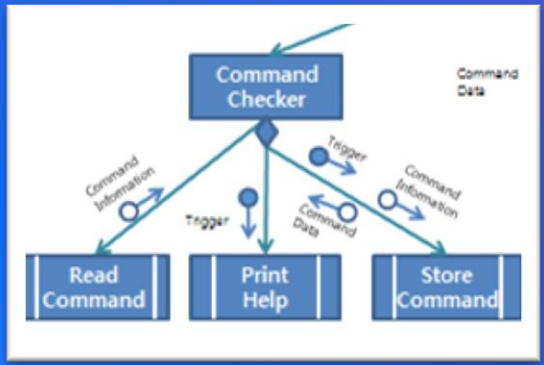
```
void PrintHelp()
{

#ifdef _DEBUG
    puts("#Print Help called");
#endif
    printf(HELP_MSG);
    exit(1);
}
```

help message in defined header

```
#define HELP_MSG ₩
    "₩n__ CFG Generator_Manual __₩n₩n₩
#Name₩n₩
 CG - CFG Generator ₩n₩n₩
#Usage₩n₩
 ./CG [ inputFileName ] [ reportFileName ] ₩n₩n₩
#Description ₩n₩n₩
this program make CFG ( Control Flwo Graph with c code ₩n₩n₩
 [ inputFileName ] ₩n₩
  > Space of inserting C Code File Name ₩n₩
  > It should be written clearly. ₩n₩n₩
 [ reportFileName ] ₩n₩
  > Space of inserting Report File Name ₩n₩
  > If it was empty, program make report File Name Like this₩n₩
    ₩' input File Name + .report.txt ₩' ₩n₩
```

Code from the SASD

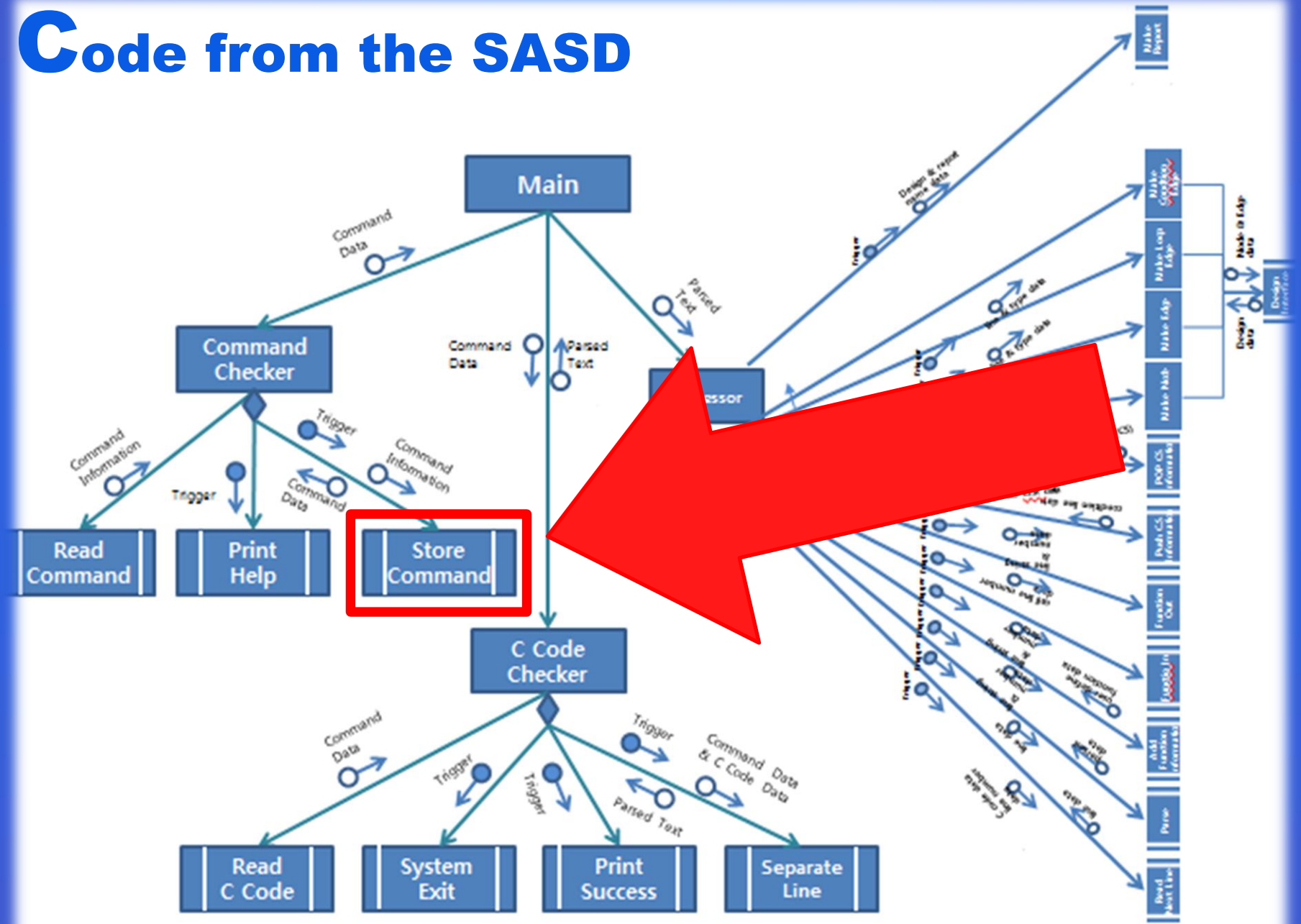
Command Checker




```
CommandData* CommandChecker(CommandInfo* cmdInfo)
{

    CommandData* tmp = StoreCommand(cmdInfo);
#ifdef _DEBUG
    puts("#CommandChecker called");
    printf(" >CommandChecker!₩n >inputFileName:%s₩n >outputFileName:%s₩n",cmdInfo->
inputFileName,cmdInfo->reportFileName);
#endif

    switch(cmdInfo->hasError)
    {
        case TRUE:
            return StoreCommand(cmdInfo);

        case FALSE:
            PrintHelp();
    }
        return NULL;
}
```

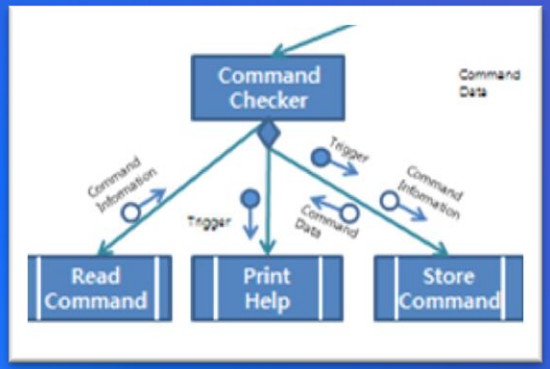
When error was not occurred

Code from the SASD



Code from the SASD

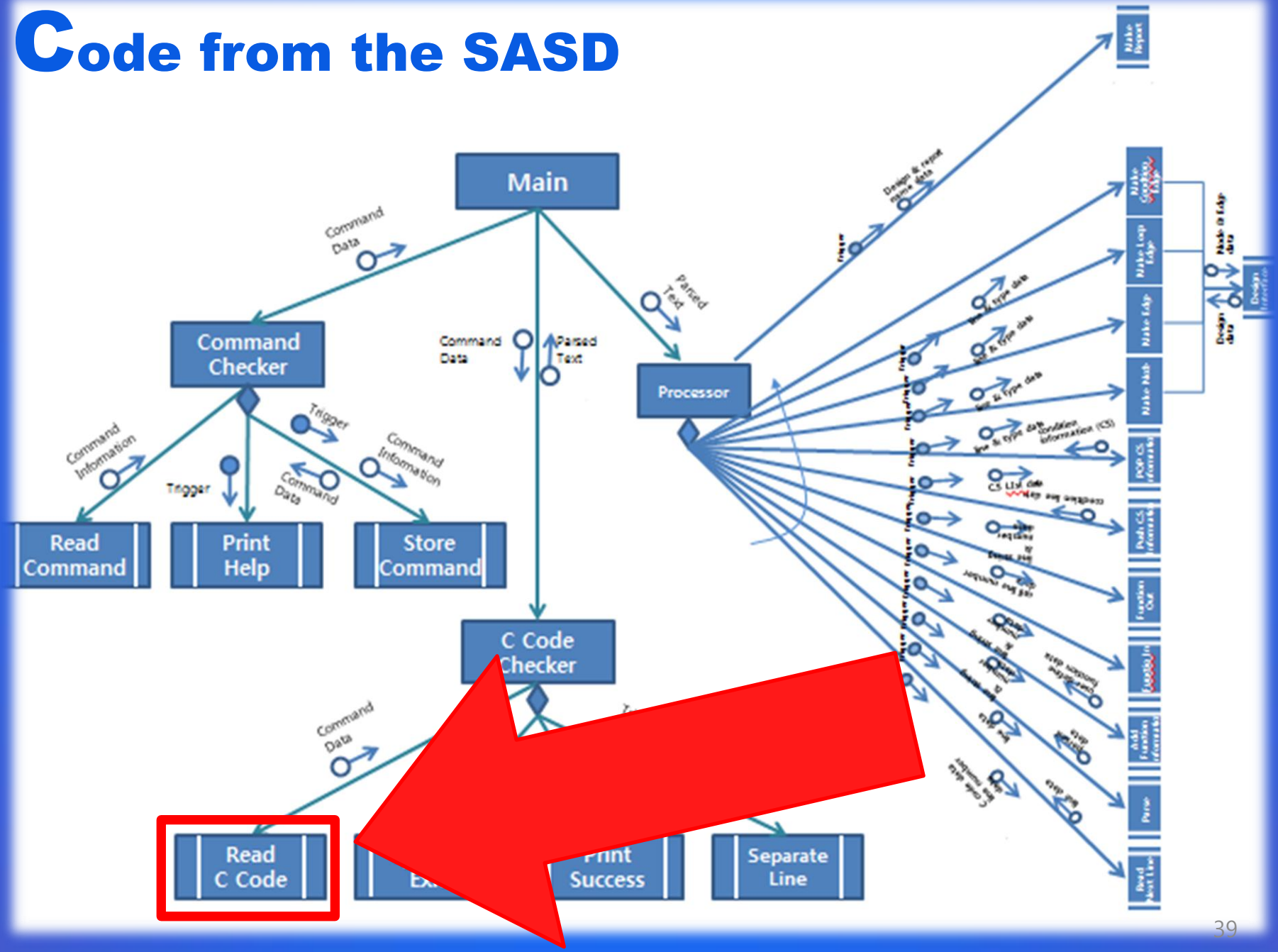
Store Command




```
CommandData* StoreCommand(CommandInfo* cmdInfo)
{

    CommandData* cmdData = (CommandData*)malloc(sizeof(CommandData));
    cmdData->inputFileName = cmdInfo->inputFileName;
    cmdData->reportFileName = cmdInfo->reportFileName;

#ifdef _DEBUG
    puts("#StoreCommand called");
    printf(" >inputFileName:%s₩n >outputFileName:%s₩n",
        cmdInfo->inputFileName, cmdInfo->reportFileName);
#endif
    return cmdData;
}
```

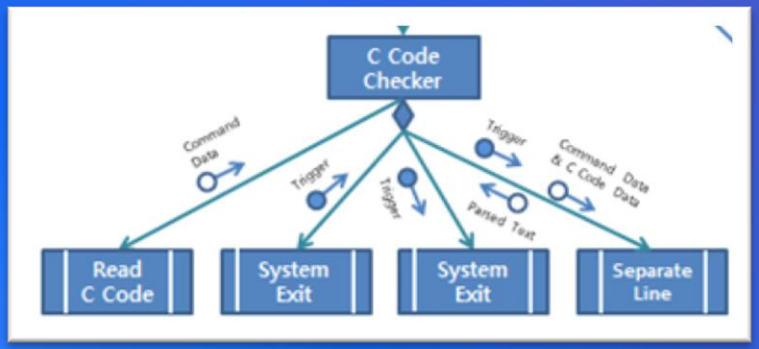
Command information convert command data

Code from the SASD



Code from the SASD

Read C Code

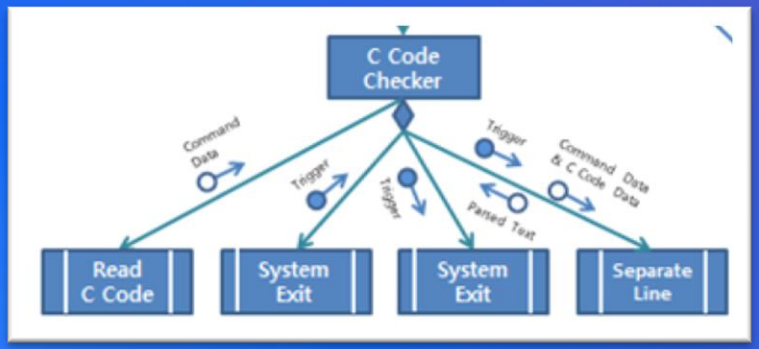



```
int main(int argc, char **argv)
{
    CommandInfo* cmdInfo;
    CommandData* cmdData;

    CCodeData* ccData;
    ParsedText* parsedData;


    cmdInfo = ReadCommand(argc,(char*)argv[1],(char*)argv[2]);

    cmdData = CommandChecker(cmdInfo);

    ccData = ReadCCode(cmdData);


    parsedData = CCodeChecker(cmdData,ccData);
```

Main function give command data to Read C Code function

Code from the SASD

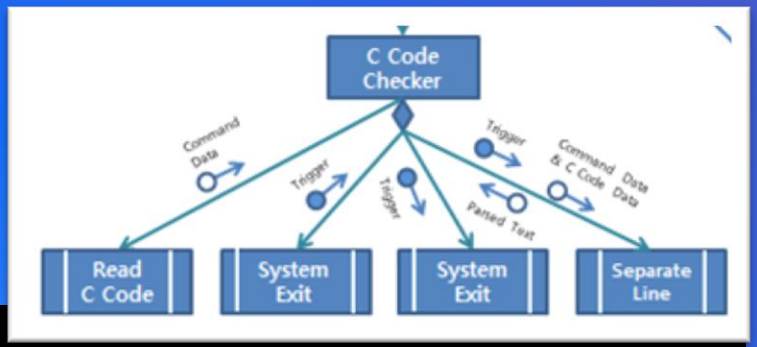
Read C Code




```
CCodeData* ReadCCode(CommandData* cmdData)
{
    int index=0;

    char* buf =(char*)malloc(sizeof(char)*BUFSIZE);
    CCodeData* ccData=(CCodeData*)malloc(sizeof(CCodeData));
    FILE* file = fopen(cmdData->inputFileName,"rt");
#ifdef _DEBUG
    puts("#ReadCCode called");
    printf(" >CommandData->inputFilename:%s\n >CommandData->reportData:%s\n",cmdDat
a->inputFileName,cmdData->reportFileName);
#endif
```

Code from the SASD

Read C Code




```
if(file==NULL)
{
    ccData->isOpen = FALSE;
    ccData->code = NULL;
```

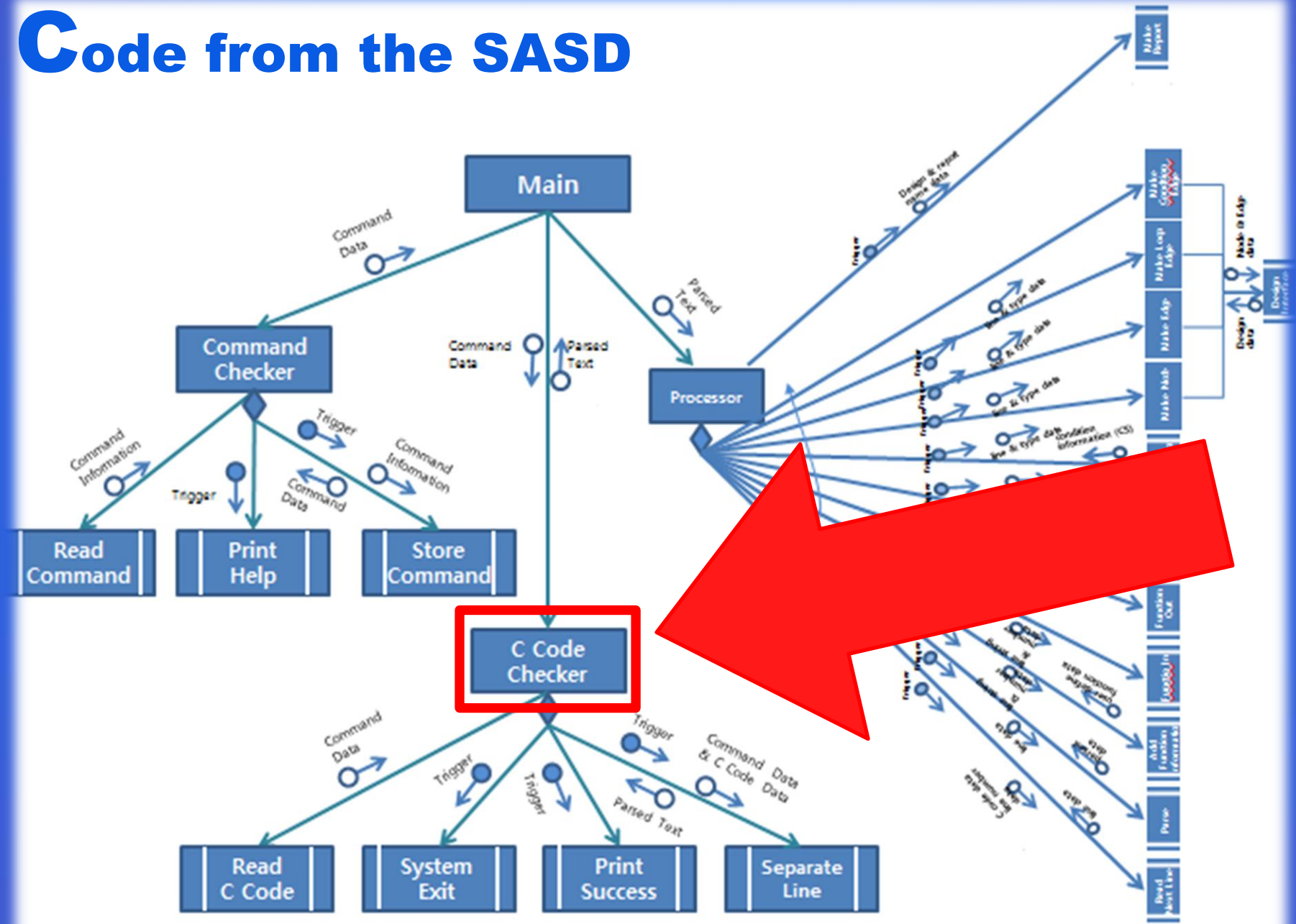
If file did not open

```
}else
{
    while(1)
    {
        buf[index++]=fgetc(file);
        if(feof(file)!=0)
            break;
    }

    buf[index]='¥0';
    ccData->code=buf;
#if
        puts("_____Read C Code");
        puts(ccData->code);
#endif
    }
#itdef _DEBUG
    printf(" >CCodeData->isOpen:%d¥n >CCodeData->code:%s¥n",ccData->isOpen,ccData->
code);
#endif
    return ccData;
}
```

If file is opened

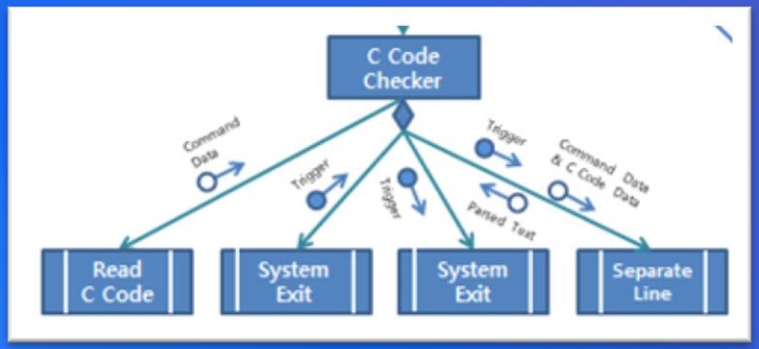
C Code Data is return

Code from the SASD



Code from the SASD

C Code Checker

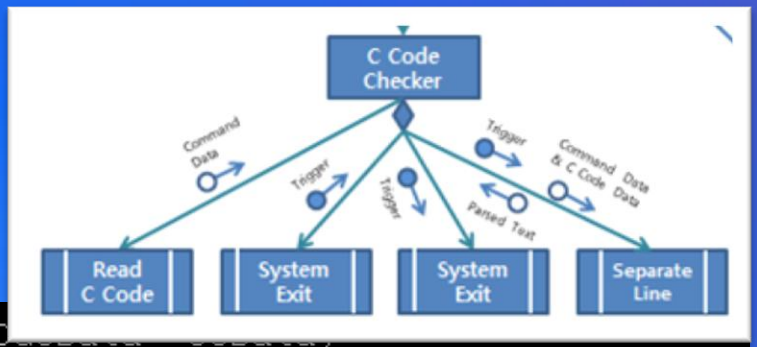



```
int main(int argc, char **argv)
{
    CommandInfo* cmdInfo;
    CommandData* cmdData;

    CCodeData* ccData;
    ParsedText* parsedData;


    cmdInfo = ReadCommand(argc,(char*)argv[1],(char*)argv[2]);

    cmdData = CommandChecker(cmdInfo);

    ccData = ReadCCode(cmdData);

    parsedData = CCodeChecker(cmdData,ccData);
```

C Code Checker take cmdData and ccData For checking file error

Code from the SASD

C Code Checker

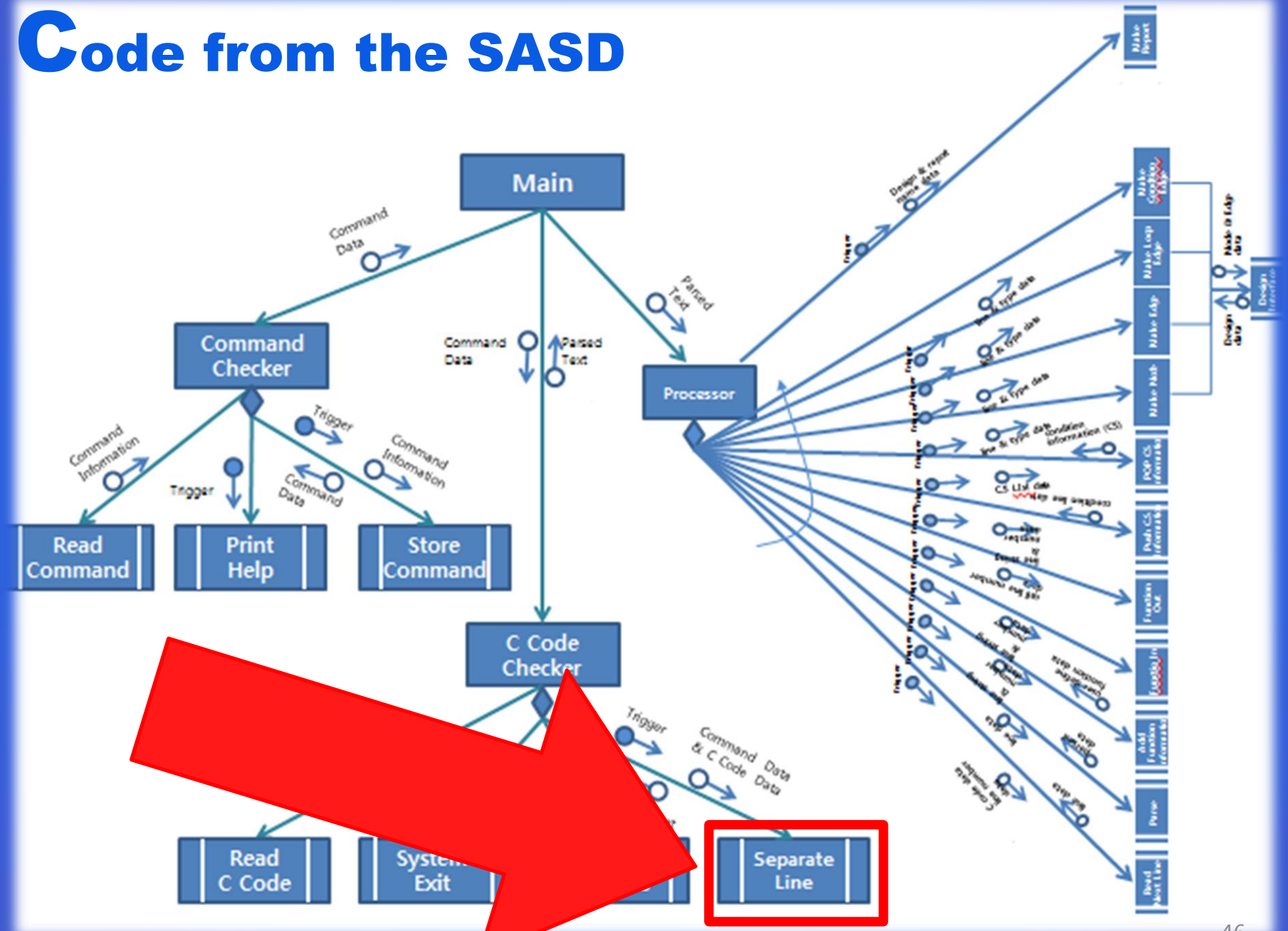



```
ParsedText* CCodeChecker(CommandData* cmdData,CC
{
#ifdef _DEBUG
    puts("#CCodeChecker called");
    printf(" >CCodeData->isOpen:%d₩n >CCodeData->code:%s₩n",ccData->isOpen,ccData->
code);
#endif
    switch(ccData->isOpen)
    {
    case TRUE:
        PrintSuccess();
        return SeperateLine(cmdData,ccData);

    case FALSE:
        SystemExit();
    }
#ifdef _DEBUG
    printf(" >CCodeChekcer : ccData -> isOpen has error element");
#endif
    SystemExit();
    return NULL;
}
```

The case no File error

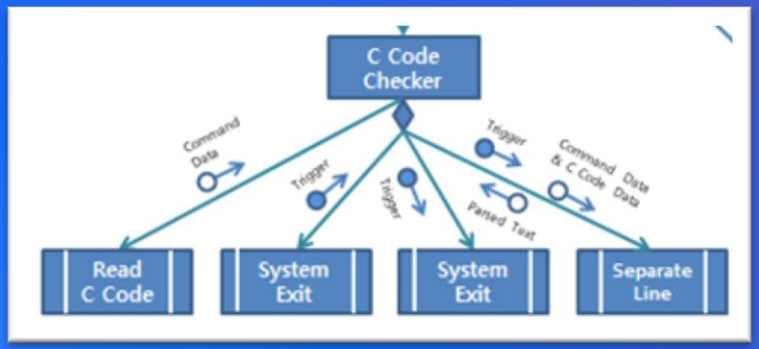
The case had File error

Code from the SASD



Code from the SASD

Separate Line



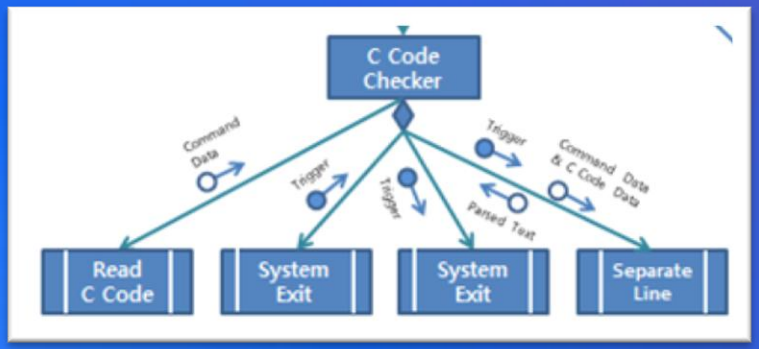
Remove White space

```
#include <stdio.h>

int main(

                )
{
        int i,j;
        j=10;

        for(i=0; i<10; i++)
        {
        printf("%d\n",i);
        }

        return 0;
}
```

```
#include <stdio.h>
int main( )
{
int i,j;
j=10;
for(i=0; i<10; i++)
{
printf("%d\n",i);
}
return 0;
}
```

Code from the SASD

Separate Line



Remove White space

```
//test2
#include <stdio.h>

int main(

                )
{
        int i,j;
        j=10;

        for(i=0;

                i<10; i++)
        {
        printf("%d\n",i);
        }

        return 0;
}
```

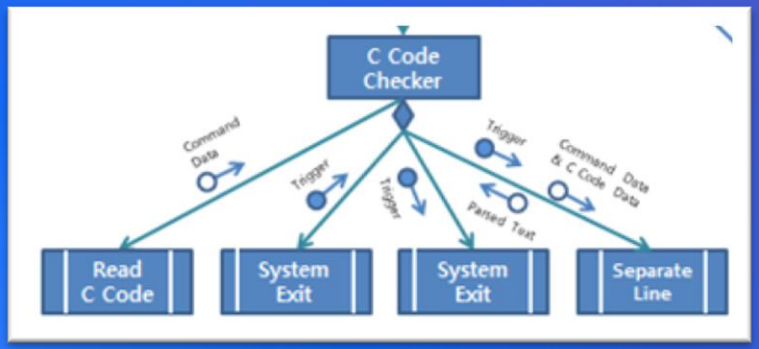
```
//test3

#include <stdio.h>

int main(                                       )
{
        int i,
              j;
        j=10;

        for(i=0;                i<10; i++)
        {
        printf("%d\n",i);
        }

        return 0;
}
```

They are SAME CODE !

```
#include <stdio.h>
int main( )
{
int i,j;
j=10;
for(i=0; i<10; i++)
{
printf("%d\n",i);
}
return 0;
}
```

Code from the SASD

Separate Line

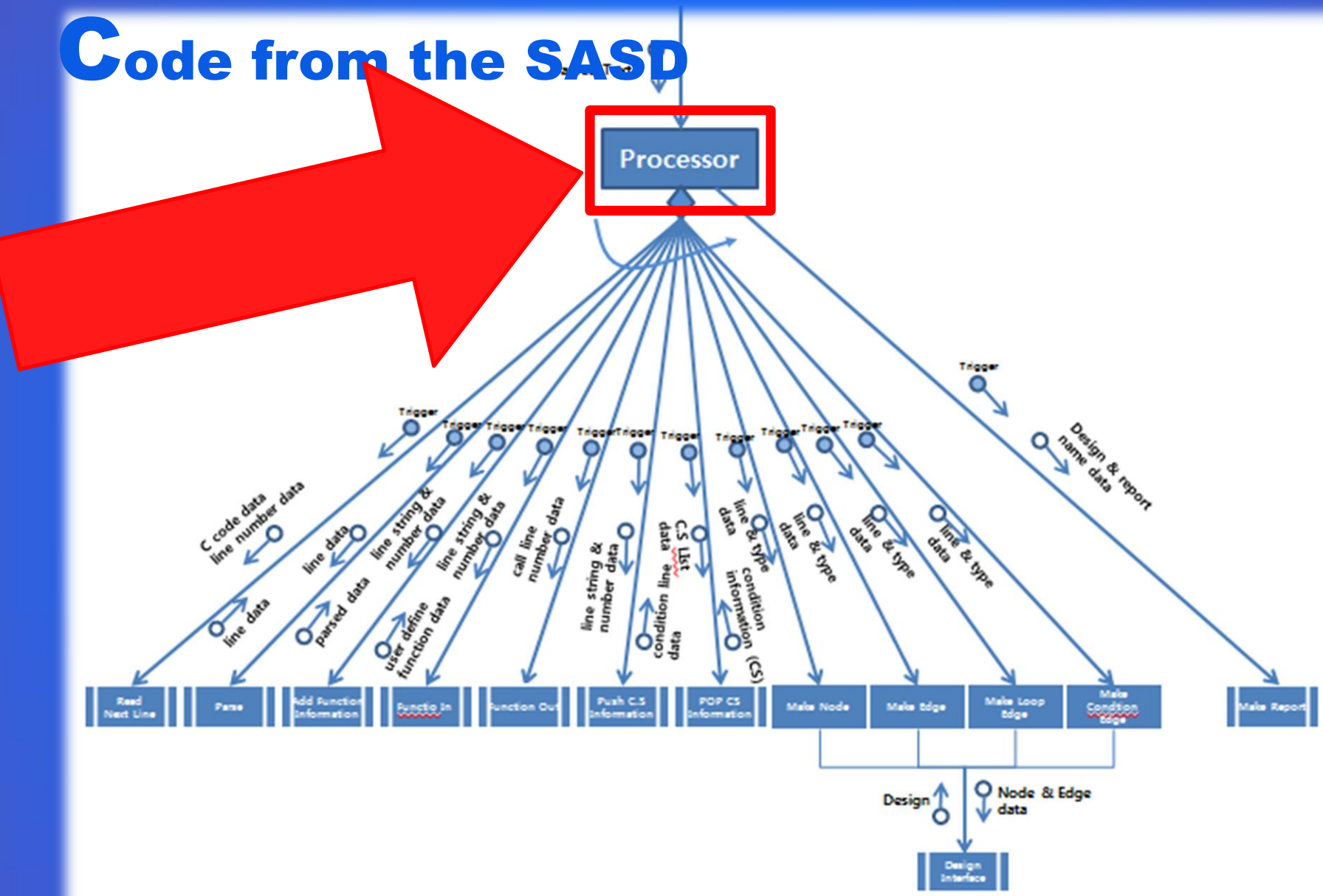


Remove Comment Lines

```
//파싱되면서 주석이 사라지는 것을 보여주기 위한 test
#include <stdio.h>

typedef unsigned char *byte_pointer; //주소값을 1byte 단위로

void show_bytes(byte_pointer start, int len)

{

    int i;

    for (i = 0; i < len; i++)

        printf(" %.2x", start[i]); //%.2x는 16진수로 2자리(1by

    printf("\n");

}


void show_float(float x) //floatx의 주소에 저장 되 있는 값을
tle endian 이다



{

    show_bytes((byte_pointer) &x, sizeof(float));

}




int main()
{
    float f=45000.67;
    show_float(f);
    printf("%f",f);
}
```

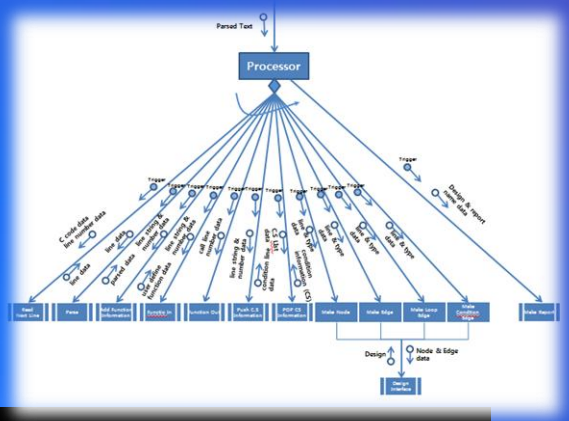
```
#include <stdio.h>
typedef unsigned char *byte_pointer;
void show_bytes(byte_pointer start, int len)
{
int i;
for (i = 0; i < len; i++)
printf(" %.2x", start[i]);

printf("\n");
}
void show_float(float x)
{
show_bytes((byte_pointer) &x, sizeof(float));
}
int main()
{
float f=45000.67;
show_float(f);
printf("%f",f);
}
```

Code from the SASD



Code from the SASD

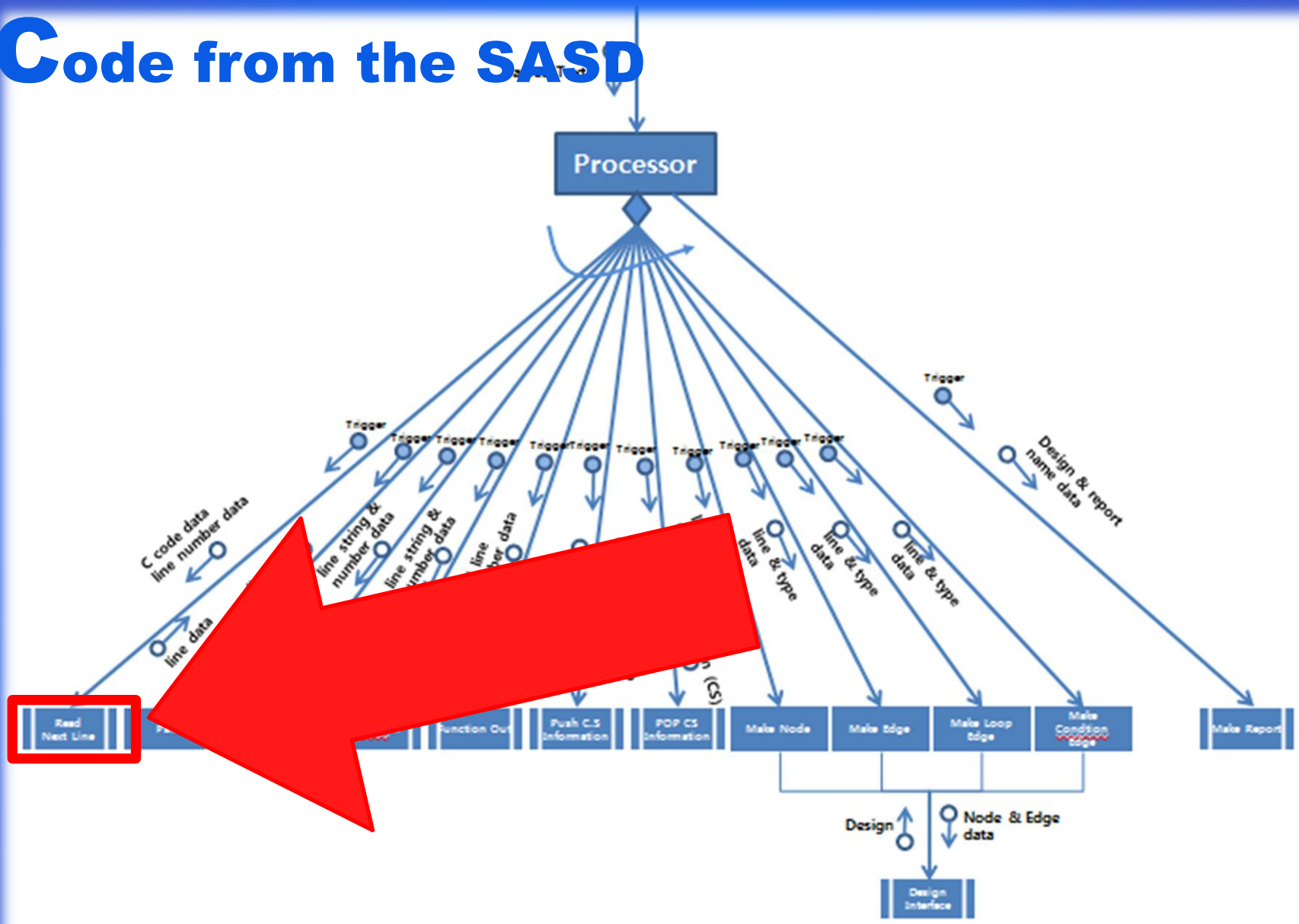
Processor




```
int main(int argc, char **argv)
{
    CommandInfo* cmdInfo;
    CommandData* cmdData;

    CCodeData* ccData;
    ParsedText* parsedData;



    cmdInfo = ReadCommand(argc,(char*)argv[1],(char*)argv[2]);

    cmdData = CommandChecker(cmdInfo);

    ccData = ReadCCode(cmdData);


    parsedData = CCodeChecker(cmdData,ccData);

    processor( parsedData );

    return 0;
```

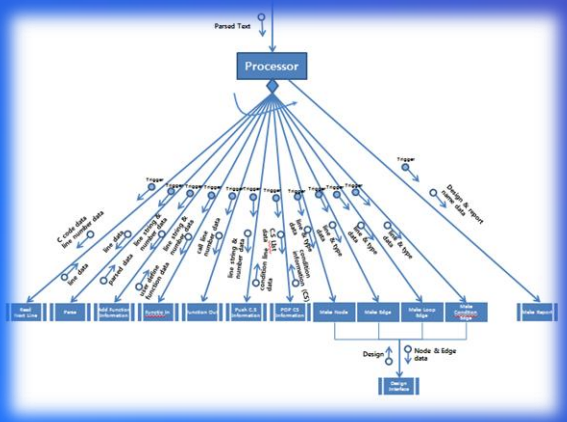
This process take parsed text from C Code Checker in main

Code from the SASD



Code from the SASD

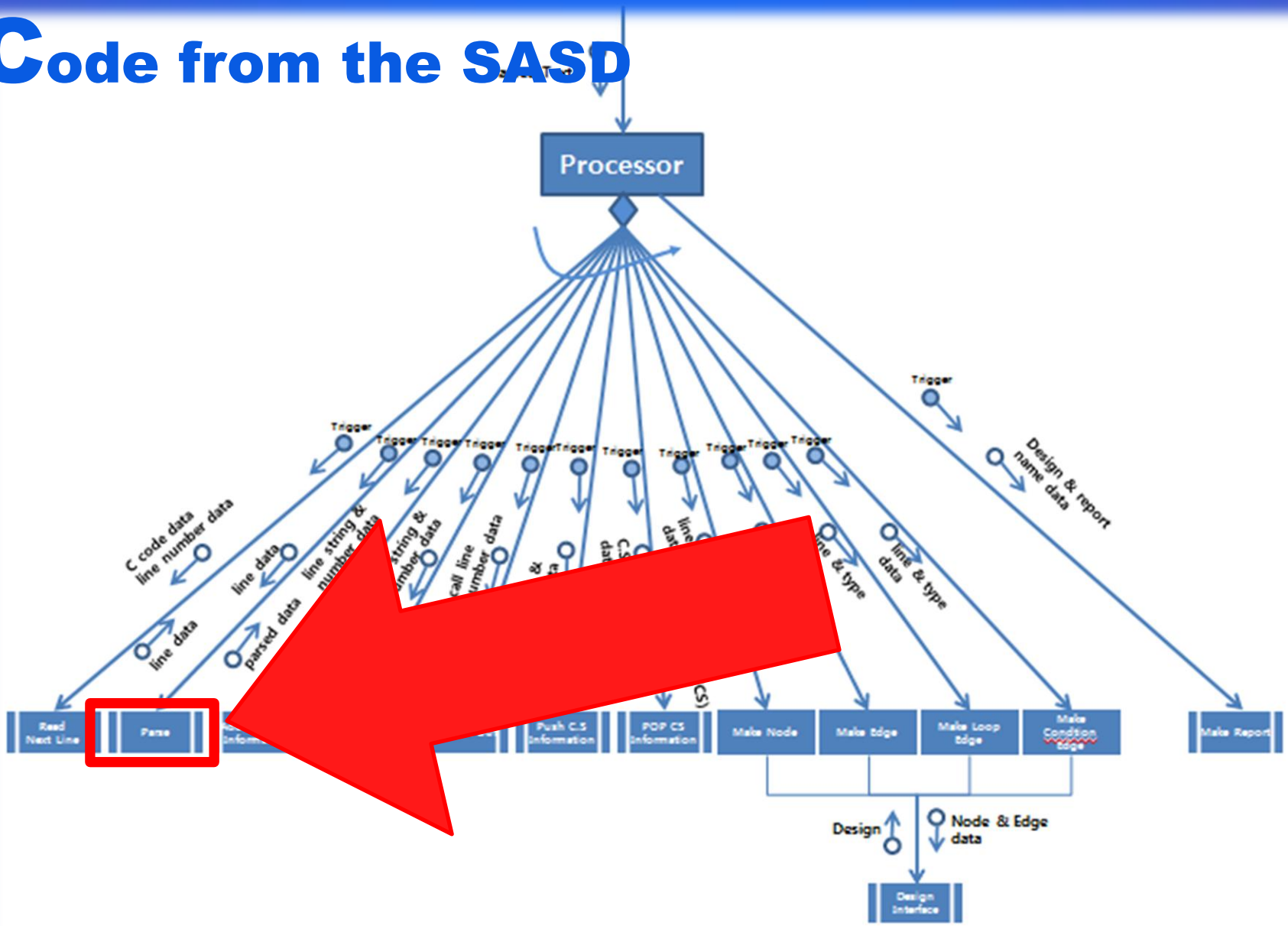
Processor




```
    DesignInterface( &design, makeNode( "start", start_node ), makeEdge( normal_edge ) );

    do{
        readNextLine( fp, &num, &line );
        type = parse( line, braket, &Flist );


        switch( type ){
            case open_braket:
                braket++;
                inBraket = TRUE;
                break;
            case close_braket:
                if( inMain == TRUE ){
                    if( braket == 1 ){
                        type = end_main;
                        inMain = FALSE;
                    }else if( braket > 1 ){
                        type = end_cs;
                    }
                }

                braket--;
                break;
            case start_main:
                DesignInterface( &design, makeNode( line[cur], normal_node ), makeEdge( normal_e
dge ) );
```

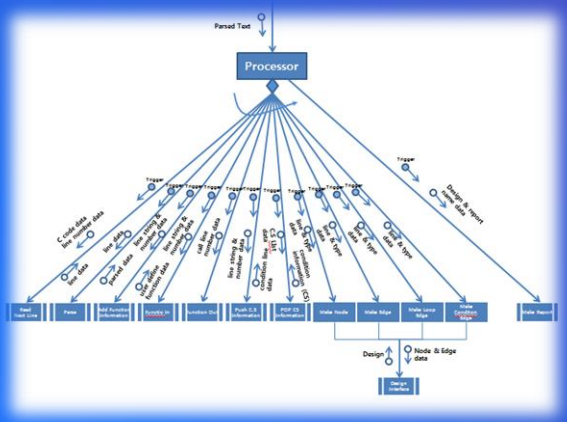
It read each Line from the text file

Code from the SASD



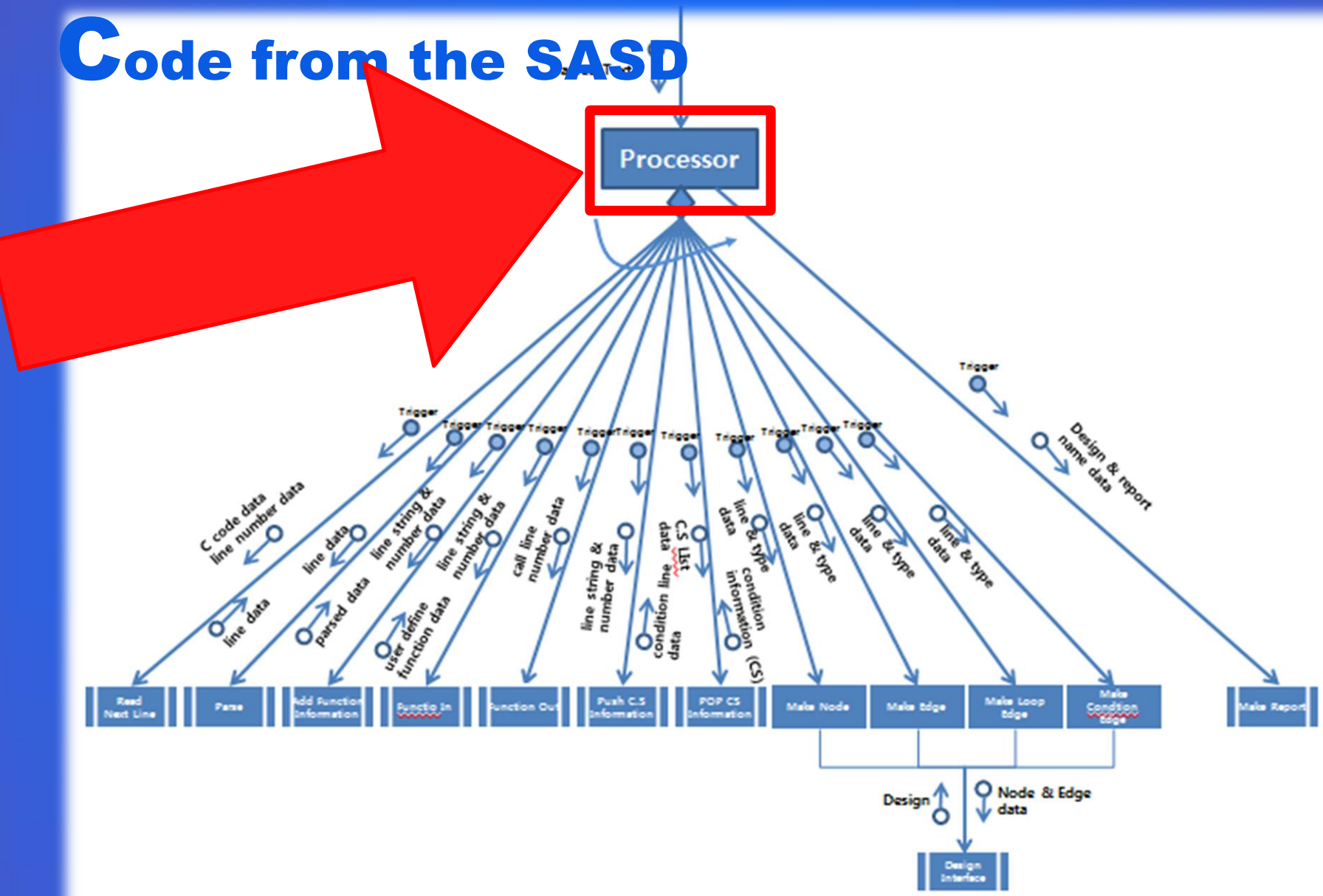
Code from the SASD

Processor



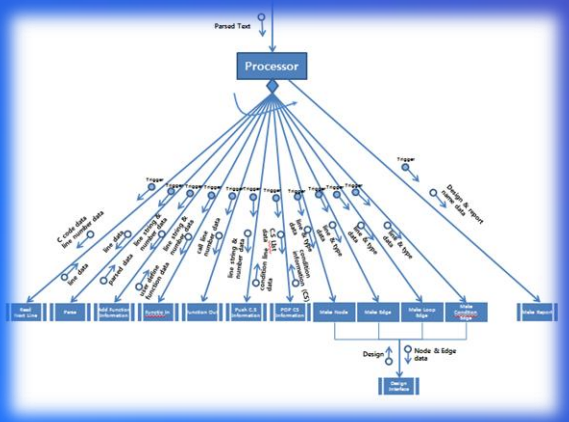

```
    DesignInterface( &design, makeNode( "start", start_node ), makeEdge( normal_edge ) );

    do{
        readNextLine( fp, &num, &line );
        type = parse( line, braket, &Flist );

        switch( type ){
            case open_braket:
                braket++;
                inBraket = TRUE;
                break;
            case close_braket:
                if( inMain == TRUE ){
                    if( braket == 1 ){
                        type = end_main;
                        inMain = FALSE;
                    }else if( braket > 1 ){
                        type = end_cs;
                    }
                }

                braket--;
                break;
            case start_main:
                DesignInterface( &design, makeNode( line[cur], normal_node ), makeEdge( normal_e
dge ) );
```

Code from the SASD



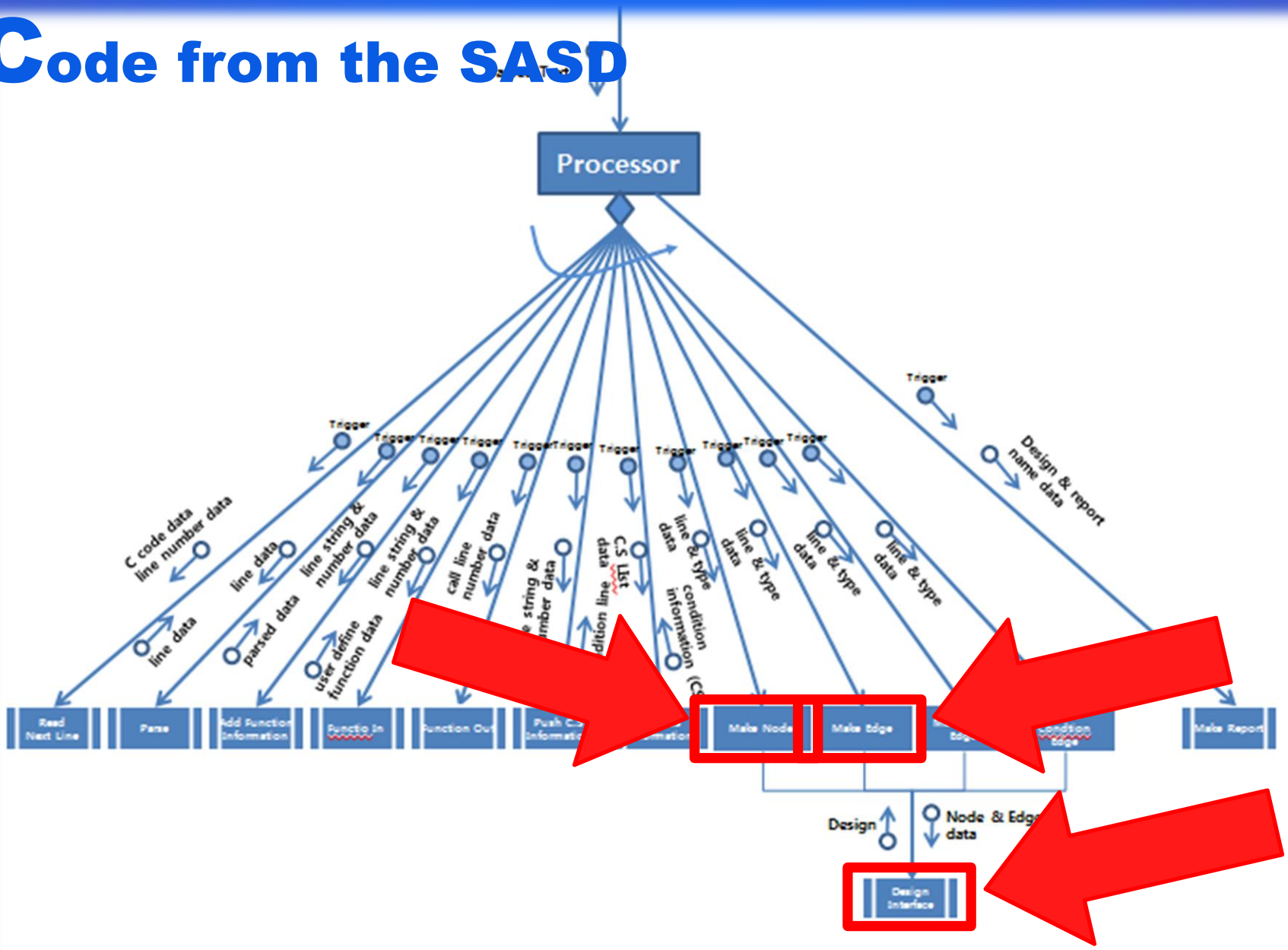
Code from the SASD

Processor



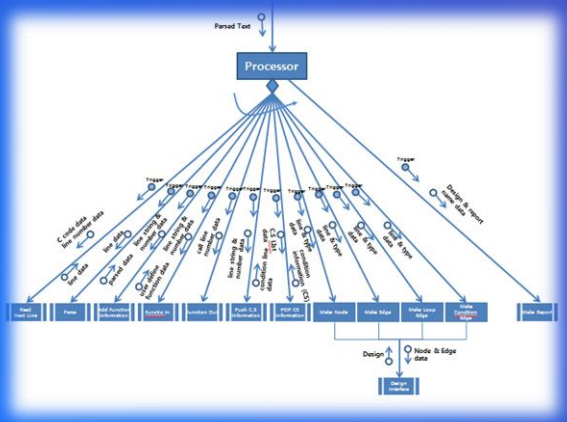

```
            case start_cs:
                if( inMain == TRUE ){
                    if( ( strchr( line[1], ';' ) == line[1] + strlen( line[1] ) - 1 ) ){
                        type = normal_line;
                    }
                    if( strstr( line[1], "while" ) == line[1] || strstr( line[1], "for" ) == lin
e[1] ){

                        csType = while_loop;
                    }else if( strstr( line[1], "do" ) == line[1] ){
                        csType = do_loop;
                    }else if( strstr( line[1], "if" ) == line[1] ){
                        if( strstr( line[2], "if" ) == line[2] ){
                            csType = if_if;
                        }else{
                            csType = cond;
                        }
                    }else if( strstr( line[1], "switch" ) == line[1] ){
                        csType = switch_cs;
                    }else if( strstr( line[1], "case" ) == line[1] ){
                        csType = case_cs;
                    }else if( strstr( line[1], "default" ) == line[1] ){
                        csType = default_cs;
                    }else if( strstr( line[1], "break" ) == line[1] ){

                            csType = break_cs;

                        type = start_cs;
                    }else if( strstr( line[1], "continue;" ) == line[1] ){
                        csType = continue_cs;
```

Code from the SASD



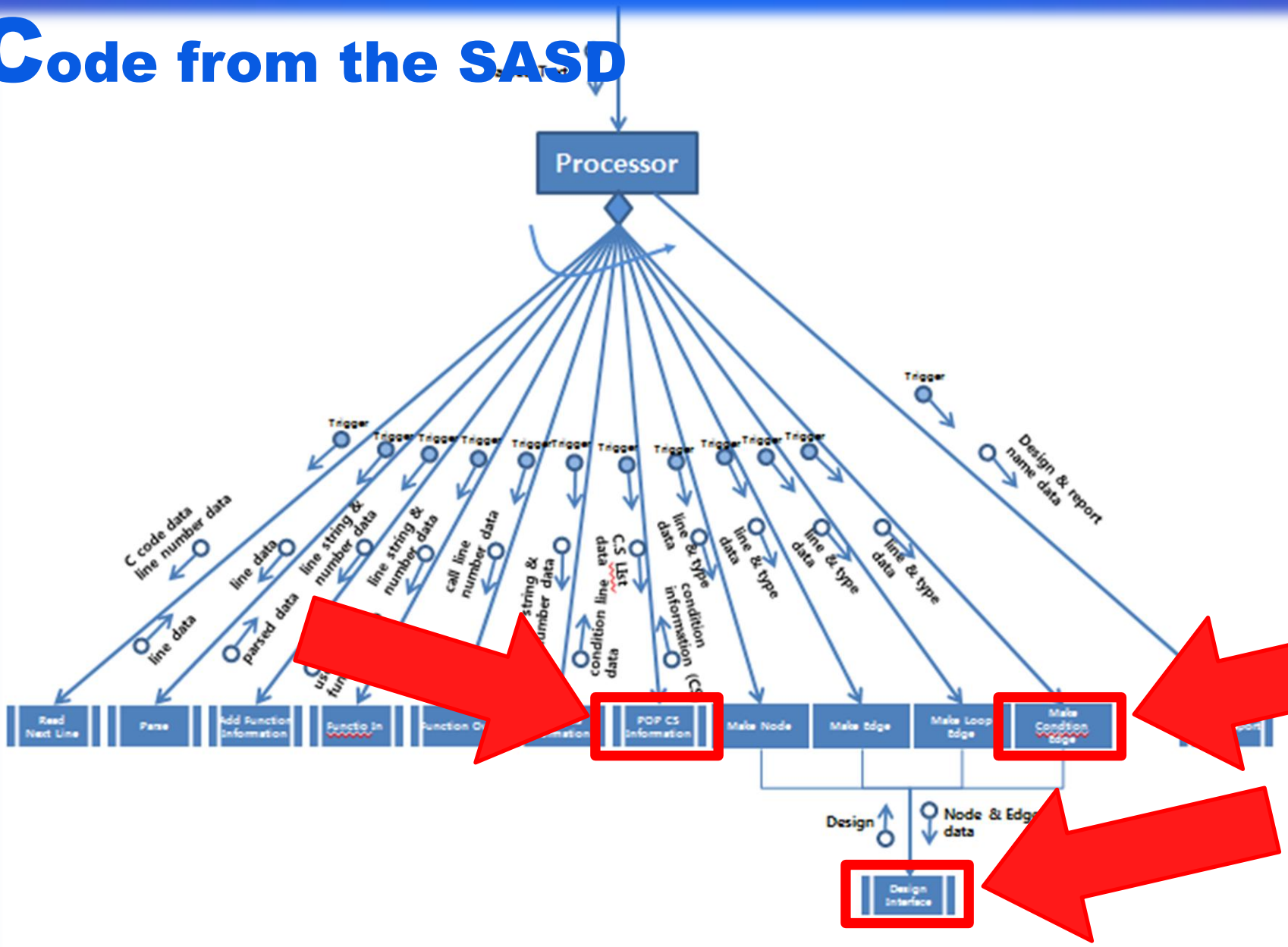
Code from the SASD

Processor



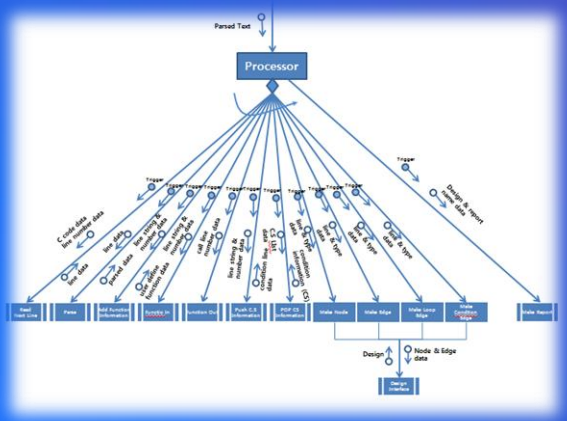

```
        if( inMain == TRUE ){
            if( braket >= 1 ){
                if( type == normal_line ){
                    DesignInterface( &design, makeNode( line[cur], normal_node ), makeEdge( norm
al_edge ) );
                }else if( type == dummy ){
                    DesignInterface( &design, makeNode( "dummy", dummy_node ), makeEdge( normal_
edge ) );
                }else if( type == start_cs ){
                    if( csType != break_cs && csType != continue_cs
                        && csType != return_func_cs && csType != return_main_cs ){
                        inBraket = FALSE;
                    }

                    switch( csType ){
                        case cond:

                            pushCSinfor( &csList, design.nodesize, cond );
                            DesignInterface( &design, makeNode( line[cur], if_node ), makeEdge(
normal_edge ) );
                            break;
                        case while_loop:

                            pushCSinfor( &csList, design.nodesize, while_loop );
                            DesignInterface( &design, makeNode( line[cur], while_node ), makeEdg
e( normal_edge ) );
                            break;
```

Code from the SASD



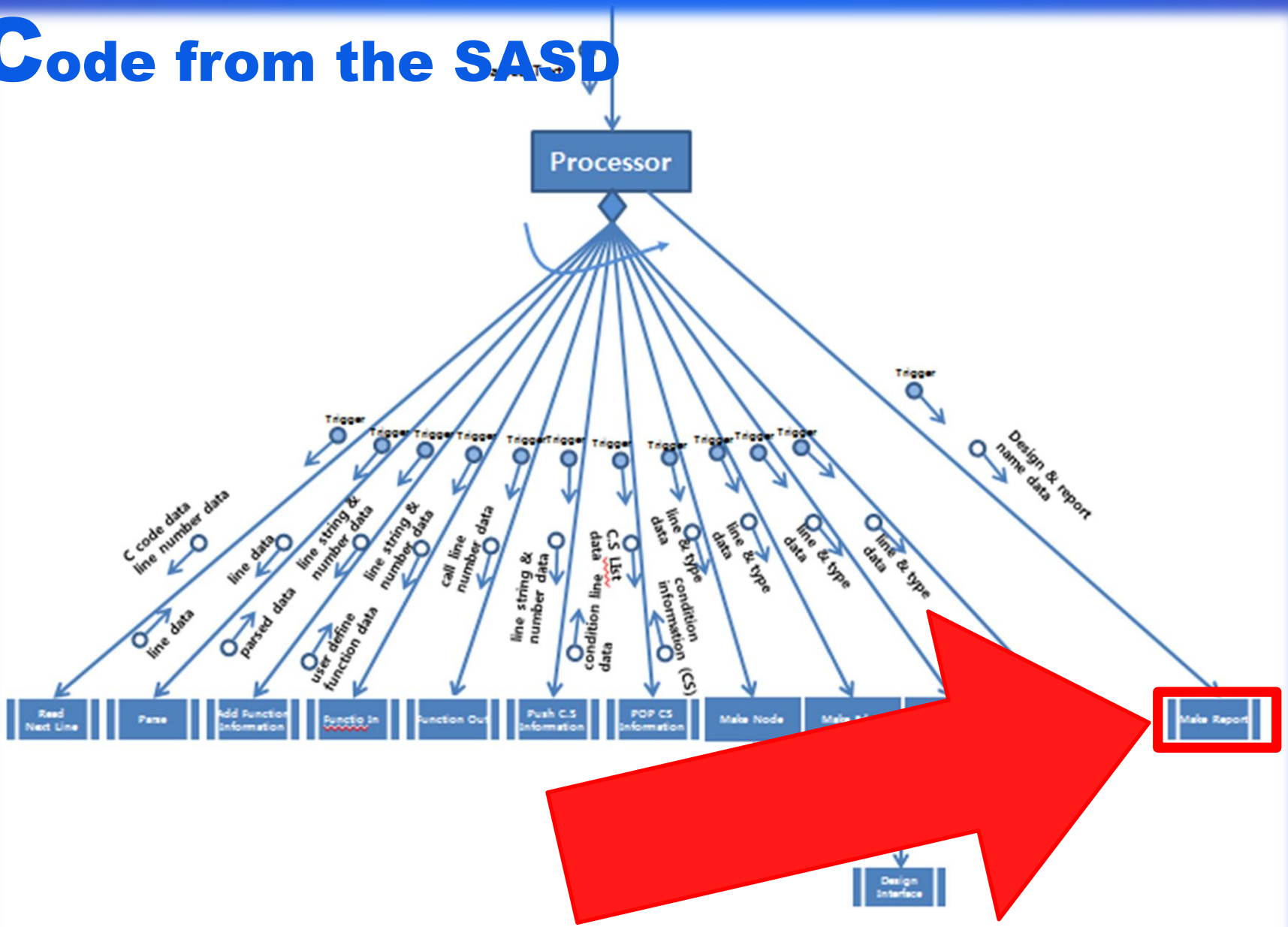
Code from the SASD

Processor



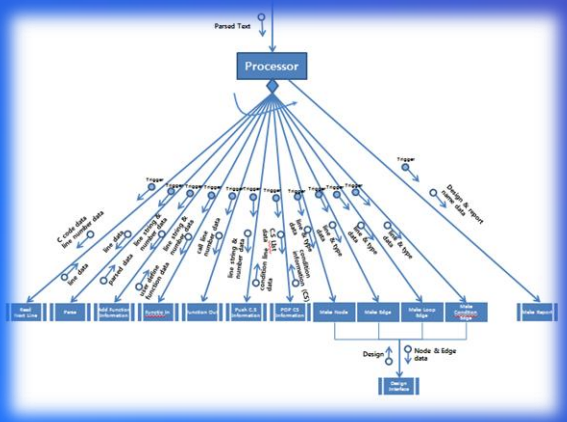

```
                    break;
                case return_func_cs:
                    pushCSinfor( &csList, design.nodesize, return_func_cs );
                    DesignInterface( &design, makeNode( line[cur], break_node ), NULL );
                    if( inBraket == FALSE ){
                        popCSinfor( &csList, &cs );
                        DesignInterface( &design, NULL, makeJumpEdge( cond_edge, cs->nod
eNum, design.nodesize ) );
                        inBraket = TRUE;
                    }
                    break;
            }else if( type == end_cs ){
                do{
                    popCSinfor( &csList, &cs );
                if(  == NULL ){
                    break;
                }
                csType = cs->csType;

                if( csType == switch_cs ){
                }else if( csType == cond || csType == else_cs || csType == case_cs ){
                    DesignInterface( &design, NULL, MakeConditionEdge( cs, design.nodesi
ze ) );
                }else if( csType == if_if ){
```

Code from the SASD



Code from the SASD

Processor




```
            }
        }
        DesignInterface( &design, makeNode( "FINISH :D", finish_node ), NULL );
    }

    if( feof( fp ) ){
        DesignInterface( &design, makeNode( "EOF @_@", eof_node ), NULL );
        break;
    }
    printf( "l:%s type:%d ct:%d ns:%d es:%dWn", line[ cur ], type, csType, design.nodesize,
design.edgesize );
    MakeReport( &design, NULL );
}while( type != end_main && line[cur] != NULL );

fclose( fp );
MakeReport( &design, parsedData->reportName );
}
```