PROJECT REPORT ON:

Compiler for
Time conversation Gujarati to English

Developed by

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CERTIFICATE

This is to certify that the project entitled “Compiler for calculating simple interest using strings ” is a bonafide report of the work carried out by

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of Department of Information Technology, semester VI, under the guidance and supervision for the award of the degree of Bachelor of Technology at Dharmsinh Desai University, Nadiad (Gujarat). They were involved in a Project in the subject of “**Language Translator**” during the academic year 2021-2022.

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Introduction

1.0.1 Project Details

Language name:

Time conversation Gujarati to English

Language Description:

Write an appropriate Time in gujarati and our compiler compile into english digit.

Example:
savar na adhi : 1 30

1.0.2 Project Planning

List of Students with their Roles/Responsibilities:

IT101 : - TOKEN GENERATED USING FLEX(CODE) , EVALUATE VALID SENTENCE USING YCC

IT102 :- TOKEN GENERATED USING FLEX(KEYWORD), EVALUATE VALID SENTENCE USING YCC , USING C PROGRAM TOKEN GENERATE , DFA DESIGN

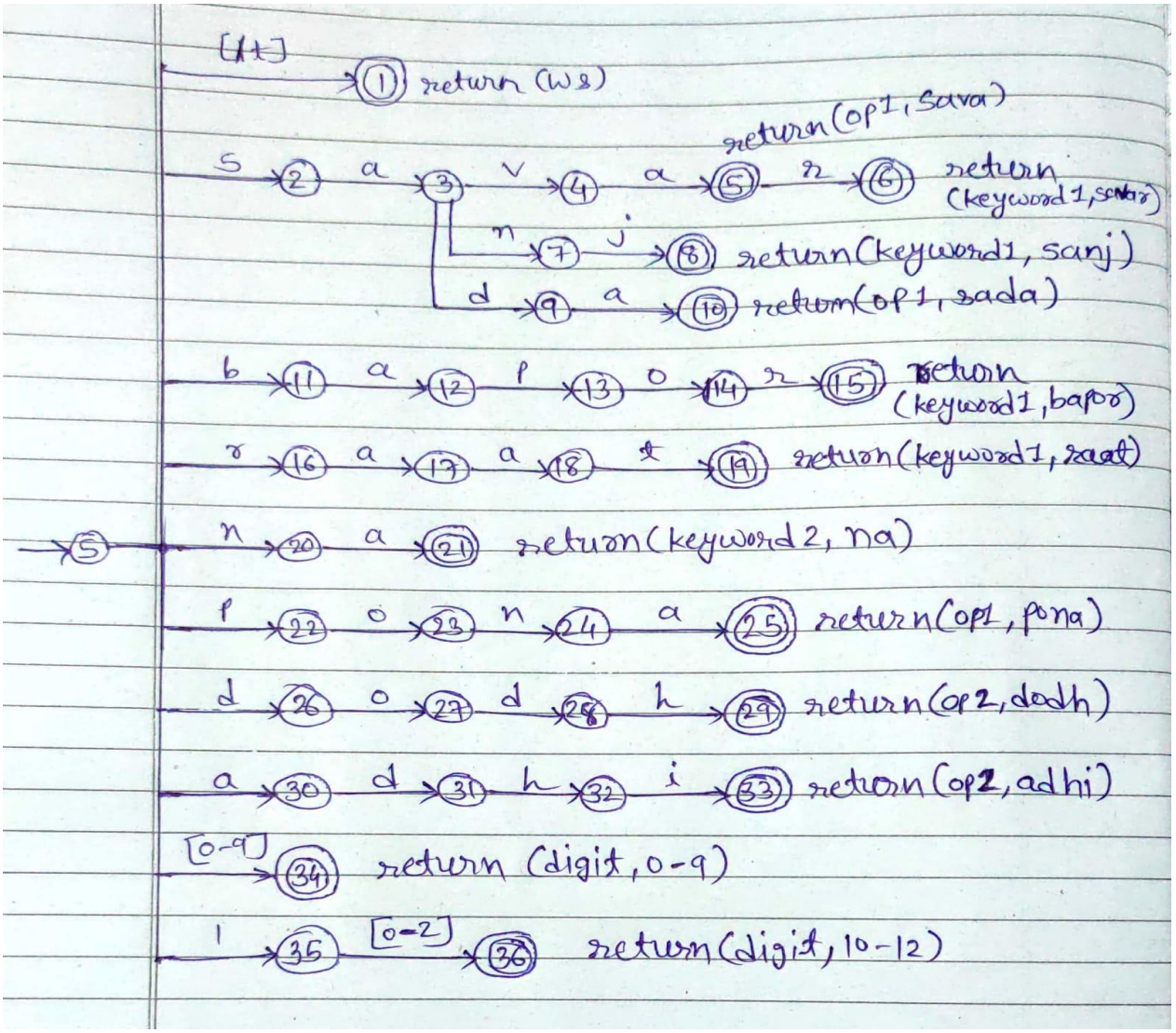
IT103 :- TOKEN GENERATED USING FLEX(CODE), EVALUATE VALID SENTENCE USING YCC , DFA ALGO

2.0 LEXICAL PHASE DESIGN

2.0.1 Regular Expression:

Digit -> [0-9]+
Keyword -> savar,bopor,sanj,raat
keyw1 -> na
Operation -> sava,sada,pona
Ope1 -> dodh,adhi

2.0.2 Deterministic Finite Automata Design for Lexer



2.0.3 Algorithm for Lexer:

```
lexer {
int c = 0;
bool f = false;
int len = string.length();
while not eof do
{
state="S";
while not eof do (c < len)
{
if (f)
{
f= false;
}
char ch = nextchar();
switch (state) {
case state of "S":
'[\t]':
state = "1";
ch = nextchar();
f = true;
break;
's':
state = "2";
```

```
ch = nextchar();
break;
'b':
state = "11";
ch = nextchar();
break;
'r':
state = "16";
ch = nextchar();
break;
'n':
state = "20";
ch = nextchar();
break;
'p':
state = "22";
ch = nextchar();
break;
'd':
state = "26";
ch = nextchar();
break;
'a':
state = "30";
ch = nextchar();
```

```
break;
'1':
state = "35";
ch = nextchar();
break;
'[1-9]':
state = "34";
ch = nextchar();
f = true;
break;
}
default:
f= true;
end case
case state of "2":
case state of 'a':
state = "3";
ch = nextchar();
break;
case state of "3":
case state of 'v':
state = "4";
ch = nextchar();
break;
case state of "4":
```

```
case state of 'a':
state = "5";
ch = nextchar();
f= true;
break;
case state of "5":
case state of 'r':
state = "6";
ch = nextchar();
f= true;
break;
case state of "3":
case state of 'n':
state = "7";
ch = nextchar();
break;
case state of "7":
case state of 'j':
state = "8";
ch = nextchar();
f=true;
break;
case state of "3":
case state of 'd':
state = "9";
```

```
ch = nextchar();
break;
case state of "9":
case state of 'a':
state = "10";
ch = nextchar();
f=true;
break;
case state of "11":
case state of 'a':
state = "12";
ch = nextchar();
break;
case state of "12":
case state of 'p':
state = "13";
ch = nextchar();
break;
case state of "13":
case state of 'o':
state = "14";
ch = nextchar();
break;
case state of "14":
case state of 'r':
```

```
state = "15";
ch = nextchar();
f=true;
break;
case state of "16":
case state of 'a':
state = "17";
ch = nextchar();
break;
case state of "17":
case state of 'a':
state = "18";
ch = nextchar();
break;
case state of "18":
case state of 't':
state = "19";
ch = nextchar();
f=true;
break;
case state of "20":
case state of 'a':
state = "21";
ch = nextchar();
f=true;
```

```
break;
case state of "22":
case state of 'o':
state = "23";
ch = nextchar();
break;
case state of "23":
case state of 'n':
state = "24";
ch = nextchar();
break;
case state of "24":
case state of 'a':
state = "25";
ch = nextchar();
break;
case state of "26":
case state of 'o':
state = "27";
ch = nextchar();
break;
case state of "27":
case state of 'd':
state = "28";
ch = nextchar();
```

```
break;
case state of "28":
case state of 'h':
state = "29";
ch = nextchar();
f=true;
break;
case state of "30":
case state of 'd':
state = "31";
ch = nextchar();
break;
case state of "31":
case state of 'h':
state = "32";
ch = nextchar();
break;
case state of "32":
case state of 'i':
state = "33";
f=true;
ch = nextchar();
break;
case state of "35":
case state of [0-2]:
```

```
state = "36";
ch = nextchar();
f=true;
break;
}
}
case state of "1":print("white space");
case state of "6"|"8"|"15"|"19":print("keyword1");
case state of "21" : print("keyword2");
case state of "5"|"6" : print("operator1");
case state of "29"|"33" : print("operator2");
case state of "34" : print("digit 0-9");
case state of "36" : print("digit 10-12");
```

2.0.4 Implementation of lexer

Flex Code:

```
%{
#include<stdio.h>
%}
Digit [0-9]+
Keyword "savar"|"bopor"|"sanj"|"raat"
keyw1 "na"
Operation "sava"|"sada"|"pona"
Ope1 "dodh"|"adhi"
%%
{Keyword} {printf("Keyword: %s\n",yytext);}
{keyw1} {printf("Keyword1: %s\n",yytext);}
{Operation} {printf("Operation: %s\n",yytext);}
{Ope1} {printf("Operation1: %s\n",yytext);}
{Digit} {printf("Digit: %s\n",yytext);}
.|\n   {}
%%
int yywrap(){
return 0;
}
int main() {
    extern FILE *yyin,*yyout;
    yyin=fopen("input.txt","r");
    yyout=fopen("output.txt","w");
    yylex();
```

```
    return 0;
}
```

2.0.5 Execution environment setup

Step by Step Guide to Install FLEX and Run FLEX Program using

Command Prompt(cmd)

Step 1

/*For downloading CODEBLOCKS */ - Open your Browser and type in "codeblocks"

- Goto to Code Blocks and go to downloads section

- Click on "Download the binary release"

- Download codeblocks-20.03mingw-setup.exe

- Install the software keep clicking on next

/*For downloading FLEX GnuWin32 */ - Open your Browser and type in "download flex gnuwin32"

- Goto to "Download GnuWin from SourceForge.net"

- Downloading will start automatically

- Install the software keep clicking on next

/*SAVE IT INSIDE C FOLDER*/

Step 2 /*PATH SETUP FOR CODEBLOCKS*/ - After successful installation

Goto program files->CodeBlocks-->MinGW-->Bin

- Copy the address of bin :-

it should somewhat look like this

C:\Program Files (x86)\CodeBlocks\MinGW\bin

- Open Control Panel-->Goto System-->Advance System Settings-->Environment Variables

- Environment Variables--> Click on Path which is inside System

variables - Click on edit - Click on New and paste the copied path to it:-

- C:\Program Files (x86)\CodeBlocks\MinGW\bin

- Press Ok!

Step 3 /*PATH SETUP FOR GnuWin32*/ - After successful installation Goto C folder

- Goto GnuWin32-->Bin

- Copy the address of bin it should somewhat look like this

C:\GnuWin32\bin

- Open Control Panel-->Goto System-->Advance System Settings-->Environment Variables

- Environment Variables--> Click on Path which is inside System

variables - Click on edit - Click on New and paste the copied path to it:-

- C:\GnuWin32\bin

- Press Ok!

/*WARNING!!! PLEASE MAKE SURE THAT PATH OF CODEBLOCKS

IS BEFORE GNUWIN32---THE ORDER MATTERS*/

Step 4

- Create a folder on Desktop flex_programs or whichever name you

like - Open notepad type in a flex program

- Save it inside the folder like filename.l -Note :- also include “”” void yywrap(){} “””””” in the .l file

/*Make sure while saving save it as all files rather than as a text document*/

Step 5 /*To RUN FLEX PROGRAM*/ - Goto to Command Prompt(cmd)

- Goto the directory where you have saved the

program - Type in command :- flex filename.l - Type in command :- gcc lex.yy.c

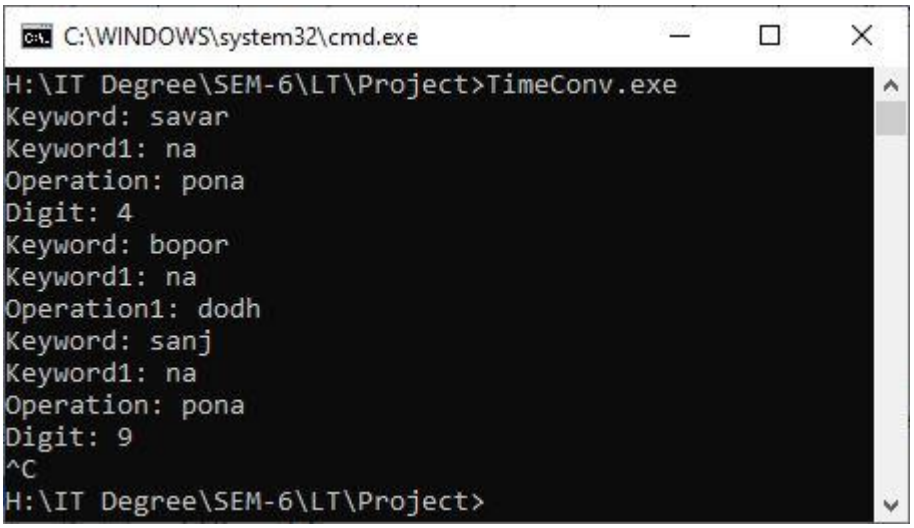
- Execute/Run for windows command promt :- a.exe

Step 6

- Finished

2.0.6 Output Screenshots of lexer.

Valid Tokens:



2.0.7 Scanner phase implementation in “C” language

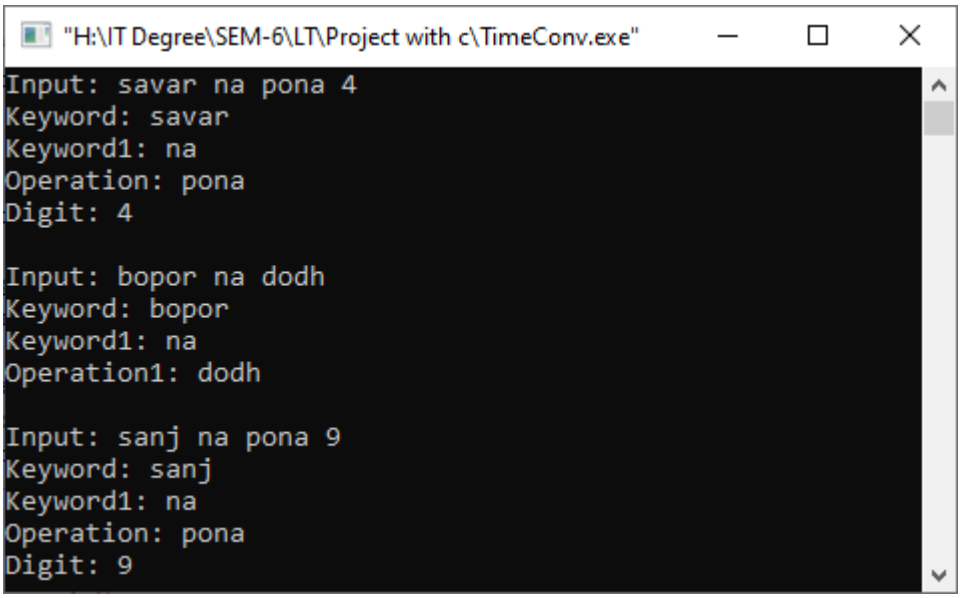
CODE:

```
#include<stdio.h>
#include<string.h>
void main()
{
   FILE* file;
   int i=0,j=0,k=0,l;
   char ch;
   char buff[10][100];
   file = fopen("input.txt","r");
   if(file == NULL)
   {
      printf("Can't access file.\n");
      return;
   }
   while (ch != EOF) {
      ch = fgetc(file);
      if(ch == '\n')
      {
         buff[i][j++] = '\0';
         i++;
         j=0;
      }
```

```
        else
            buff[i][j++] = ch;
    }
    for(k=0;k<=i;k++)
    {
        printf("Input: %s\n",buff[k]);
        char* s = strtok(buff[k]," ");
        while(s != NULL)
        {
            if((strcmp(s,"savar")==0) || (strcmp(s,"bopor")==0) ||
(strcmp(s,"sanj")==0) || (strcmp(s,"raat")==0))
                printf("Keyword: %s\n",s);
            else if(strcmp(s,"na")==0)
                printf("Keyword1: %s\n",s);
            else if((strcmp(s,"sava")==0) || (strcmp(s,"sada")==0) ||
(strcmp(s,"pona")==0))
                printf("Operation: %s\n",s);
            else if((strcmp(s,"dodh")==0) || (strcmp(s,"adhi")==0))
                printf("Operation1: %s\n",s);
            else if(isdigit(s)==0)
                printf("Digit: %s\n",s);
            s = strtok(NULL," ");
        }
        printf("\n");
    }
    fclose(file);
```

}

OUTPUT:


"H:\IT Degree\SEM-6\LT\Project with c\TimeConv.exe"
Input: savar na pona 4
Keyword: savar
Keyword1: na
Operation: pona
Digit: 4
Input: bopor na dodh
Keyword: bopor
Keyword1: na
Operation1: dodh
Input: sanj na pona 9
Keyword: sanj
Keyword1: na
Operation: pona
Digit: 9

3.0 SYNTAX ANALYZER DESIGN

3.0.1 Yacc based Implementation of syntax analyser

1) project.y(yacc code)

```
%{
/* Definition section */
#include<stdio.h>
#include<stdlib.h>
%}

%token dg k k1 op op1 eol

/* Rule Section */
%%
S: A  {printf("\nThis sentence is valid.\n"); return 0;};
 |B     {printf("\nThis sentence is valid.\n"); return 0;};
 |C     {printf("\nThis sentence is valid.\n"); return 0;};
;
A: k k1 op dg eol
;
B: k k1 dg eol
;
C: k k1 op1 eol
;
%%
void yyerror()
{
printf("Error: Invalid sentence");
exit(1);
```

```
}
//driver code
void main()
{
printf("Enter sentence: ");
yyparse();
}
```

2) project.l(Lex file)

```
%{
/* Definition section */
#include<stdio.h>
#include "time.tab.h"
%}

/* Rule Section */
%%
[0-9]+{printf("Digit: %s\n",yytext); return dg;}
"savar "|"bopor "|"sanj "|"raat "        {printf("Keyword: %s\n",yytext);
return k;}
"na " {printf("Keyword1: %s\n",yytext); return k1;}
"sava "|"sada "|"pona "  {printf("Operation: %s\n",yytext); return op;}
"dodh"|"adhi"       {printf("Operation1: %s\n",yytext); return op1;}
\n {return eol;}
.         ;
%%

int yywrap()
{
return 1;
}
```

3.0.2 Execution environment setup

Download flex and bison from the given links.
http://gnuwin32.sourceforge.net/packages/flex.htm
http://gnuwin32.sourceforge.net/packages/bison.htm

when installing on windows you store this in c:/gnuwin32 folder and not in c:/program files(X86)/gnuwin32

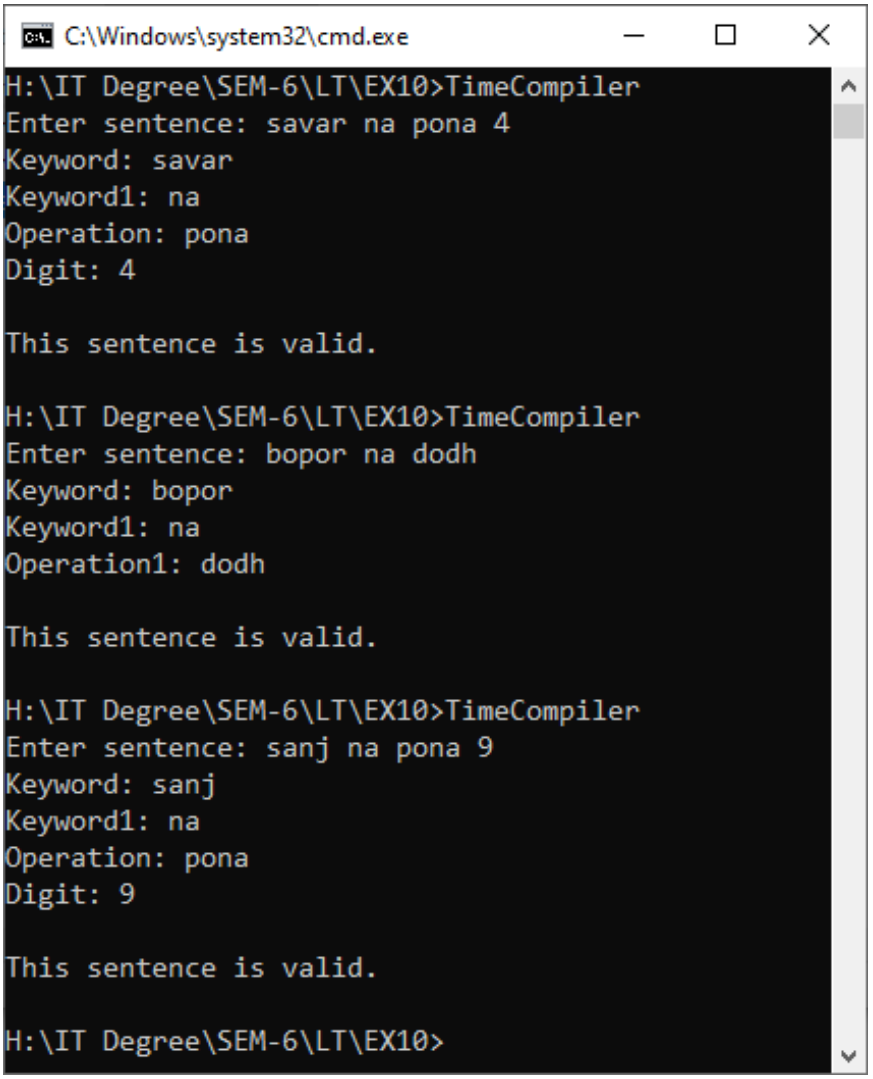
Download IDE

https://sourceforge.net/projects/orwelldevcpp/ set environment variable for flex and bison. To run the program:
Open a prompt, cd to the directory where your ".l" and ".y" are, and compile them with:

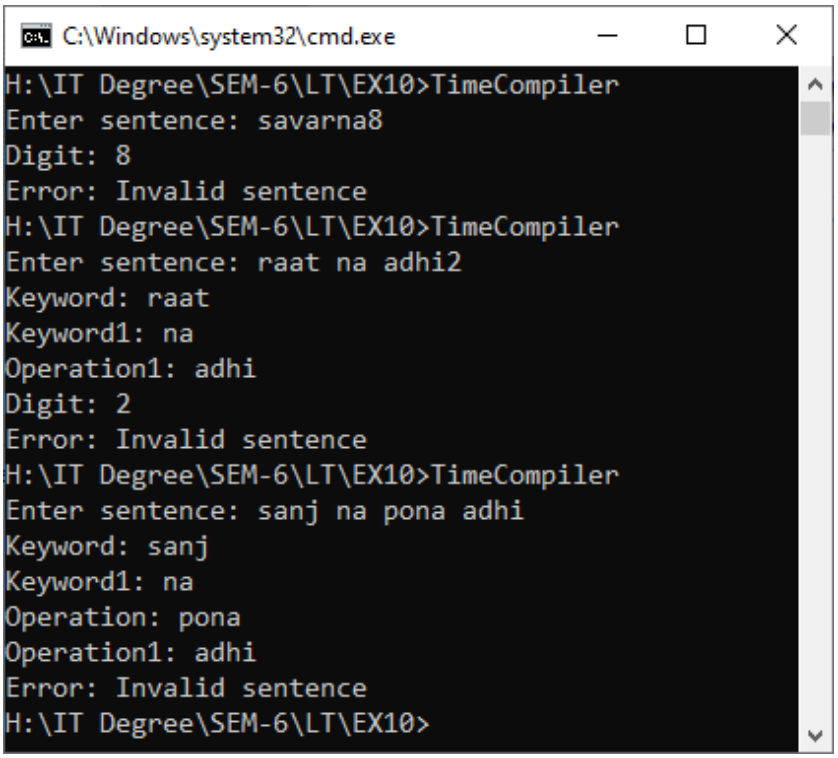
yacc -d time.y
lex time.l
cc time.tab.c lex.yy.c -o TimeCompiler

3.0.3 Output screenshots of yacc based implementation

Valid Case:



Invalid Case:



4.0 CONCLUSION

The project has been implemented based on our syllabus of compiler design and practicals in the lab . After the completion of the project and the implementation of our own language, we translate gujarati to english time conversion and understand how the compiler works and how to check errors present in code.