

# Extending Cradle pas

May 24, 2018

LAB4

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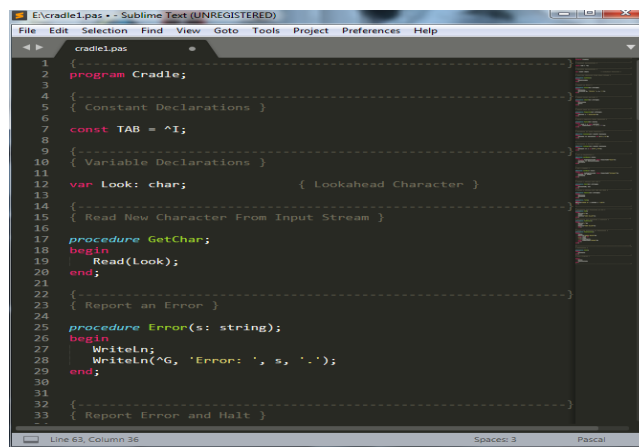
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## 1 The purpose lab4

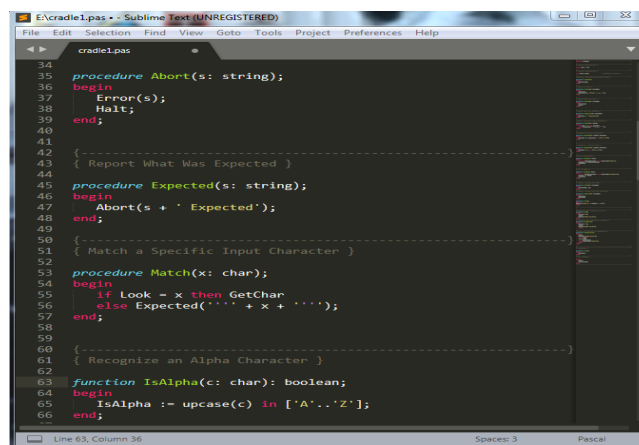
The purpose of this is to learn how to parse and translate mathematical expressions. We would like to see as output is a series of assembler-language statements that perform the desired action.

## 2 Step 1: Edited Program on Sublime text



```
1  {-----}
2  program Cradle;
3
4  {-----}
5  { Constant Declarations }
6
7  const TAB = ^I;
8
9  {-----}
10 { Variable Declarations }
11
12 var Look: char;          { Lookahead Character }
13
14 {-----}
15 { Read New Character From Input Stream }
16
17 procedure GetChar;
18 begin
19   Read(Look);
20 end;
21
22 {-----}
23 { Report an Error }
24
25 procedure Error(s: string);
26 begin
27   Writeln;
28   Writeln(^G, 'Error: ', s, '.');
29 end;
30
31 {-----}
32 { Report Error and Halt }
33
34
```

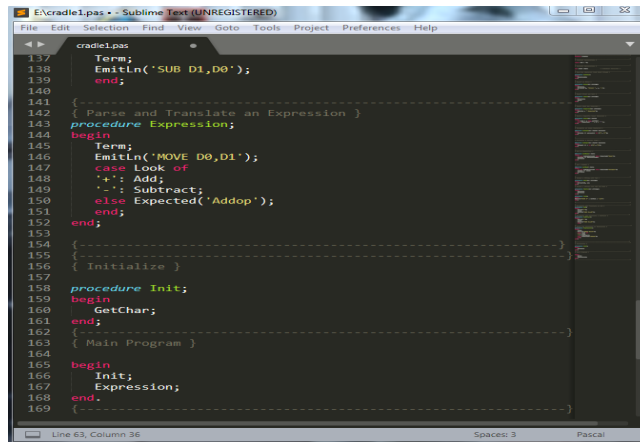
Figure 1:



```
34
35 procedure Abort(s: string);
36 begin
37   Error(s);
38   Halt;
39 end;
40
41 {-----}
42 { Report What Was Expected }
43
44 procedure Expected(s: string);
45 begin
46   Abort(s + ' Expected');
47 end;
48
49 {-----}
50 { Match a Specific Input Character }
51
52 procedure Match(x: char);
53 begin
54   if Look = x then GetChar
55   else Expected('' + x + '');
56 end;
57
58 {-----}
59 { Recognize an Alpha Character }
60
61 function IsAlpha(c: char): boolean;
62 begin
63   IsAlpha := uppercase(c) in ['A'..'Z'];
64 end;
65
66
```

Figure 2:





```
137 Term;  
138 EmitLn('SUB D1,D0');  
139 end;  
140  
141 {-----  
142 { Parse and Translate an Expression }  
143 procedure Expression;  
144 begin  
145   Term;  
146   EmitLn('MOVE D0,D1');  
147   case Look of  
148     '+': Add;  
149     '-': Subtract;  
150     else Expected('Addop');  
151   end;  
152 end;  
153  
154 {-----  
155 { Initialize }  
156 { Initialize }  
157  
158 procedure Init;  
159 begin  
160   GetChar;  
161 end;  
162 {-----  
163 { Main Program }  
164  
165 begin  
166   Init;  
167   Expression;  
168 end;  
169 {-----
```



Figure 4: Loaded and compiled cradle.pas

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: TURBO
To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

HAVE FUN!
The DOSBox Team http://www.dosbox.com

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>MOUNT B: C:\
Mounting c:\ is NOT recommended. Please mount a (sub)directory next time.
Drive B is mounted as local directory C:\

Z:\>B\
Illegal command: B\

Z:\>B:\

B:\>CD TPascal4

B:\TPASCAL4>cd turbo.exe
Unable to change to: turbo.exe.

B:\TPASCAL4>TURBO.EXE
```

Figure 5: Mounted C drive and executed TPascal

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: TURBO
Z:\>mount B: c:\
Mounting c:\ is NOT recommended. Please mount a (sub)directory next time.
Drive B is mounted as local directory c:\

Z:\>b:

B:\>cd tpascal4

B:\TPASCAL4>turbo.exe

7*7
Runtime error 202 at 0000:02DB.

7-4
    MOVE #7,D0
    MOVE D0,D1
    MOVE #4,D0
    SUB D1,D0

9+3
    MOVE #9,D0
    MOVE D0,D1
    MOVE #3,D0
    ADD D1,D0
Press any key to return to Turbo Pascal_
```

Figure 6: Implementation of output