Sinirli Turkce Programlama Dili Derleyicisi - SiNiR

CmpE 150.03 Introduction to Computing, Fall 2020
Homework 5 – Due: 28/12/2020, 23.59

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In this homework, you are going to implement the SiNiR compiler. The details are as follows:

Given a file named **calc.in**, your program should check whether there are any syntax errors.
- There will always be a file named **calc.in**
- There will be no tab character in the file.
- If there is a syntax error,
    ○ Create a new file, named **calc.out** and print "Dont Let Me Down" inside.
- If there are no syntax errors,
    ○ Create a new file, named **calc.out** and print "Here Comes the Sun" inside.
- Do not print out anything to the terminal in the submitted file.

calc.in is composed of three parts. If one of those parts are missing, there is a syntax error.

```
AnaDegiskenler
<init-statement>
<init-statement>
<init-statement>
….
YeniDegiskenler
<mid-statement>
<mid-statement>
<mid-statement>
…..
Sonuc
<final-statement>
```

The general structure of **calc.in** should be in the following form:
- Empty lines are allowed anywhere in the file.
- Spaces are allowed at any point unless specified. There should be no space in the shaded sequences. For example, there might be space before AnaDegiskenler or after; however there should be no space between <digit>.<digit>.
- The file should start with the AnaDegiskenler statement. If not, there is a syntax error.
- There are zero or more <init-statement>s after AnaDegiskenler statement. Each <init-statement> should be in a single line. If not, there is a syntax error.
- The file then continues with the YeniDegiskenler statement. If not, there is a syntax error.
- There are zero or more <mid-statement>s after the YeniDegiskenler statement. Each <mid-statement> should be in a single line. If not, there is a syntax error.
- The file continues with the Sonuc statement. If not, there is a syntax error.
- There is zero or one <final-statement> after the Sonuc statement. <final-statement> should be in a single line. If not, there is a syntax error.

Important:
- The language is case sensitive.
- Keywords cannot be used as variable names.

<init-statement>

- Any number of spaces (including space and tab) are allowed in <init-statement>
- <var-name> is composed of at most ten alpha-numeric characters
- The same variable cannot be assigned more than once
- <value> := <a-term> | <l-term>
  - the above line means that <value> can be <a-term> or <l-term>
- <a-term> := <digit> | <digit>.<digit> | <t-digit> | <t-digit> nokta <t-digit>
- <digit>   := 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
- <t-digit>   := sifir | bir | iki | uc | dort | bes | alti | yedi | sekiz | dokuz
- <l-term>   := dogru | yanlis
- If above rules do not hold, it's syntax error.

<mid-statement>

- is constructed by
  - <var-name> degeri <expression> olsun

- Any number of spaces are allowed in <mid-statement>
- <var-name> is composed of at most ten alpha-numeric characters
- the same variable cannot be assigned more than once.
- <expression> := <arith-expr> | <logic-expr>
  - i.e. <expression> should be either <arith-expr> or <logic-expr>
- <var-name> will be of type float if it is <arith-expr>
- <var-name> will be of type boolean if it is <logic-expr>

- <arith-exp> := <open-paran> <arith-exp> <close-paran>
            := <arith-exp> <binaop> <arith-exp>
            := <a-term>
            := <a-var-name>
- <open-paran> := (| ac-parantez

- <clos-paran> :=) | kapa-parantez

- <binaop> := + | - | * | arti | eksi | carpi

- <a-var-name> should represent a variable of type int or float
- <a-var-name> should be defined in the previous lines.

- <logic-exp> := <open-paran> <logic-exp> <close-paran>
            := <logic-exp> <binlop> <logic-exp>
            := <l-term>
            := <l-var-name>
- <binlop> := ve | veya

- <l-var-name> should represent a variable of type boolean
- <l-var-name> should be defined in the previous lines.
- If above rules do not hold, it's syntax error.

\<final-statement\>

- is constructed by:

  \<expression\>
- The same rules for \<expression\> apply (as above).
- Any number of spaces are allowed in \<final-statement\>
- If above rules do not hold, there is a syntax error.

Submission: You will submit a single python file over Moodle. Your .py file should be named with the underscore character (_) followed by your student number (e.g. _2019700030.py).

Your homework will be evaluated in different categories so that you can collect **partial points**:

A	Correctly parse the file without any \<init-statement\>, \<mid-statement\>, \<final-statement\>	+5	If the code fails in this test case, the absolute grade will be **zero**
B	Correctly parse \<init-statement\>s composed of only integers	+10	
C	Correctly parse \<init-statement\> composed of combination of integers, floats and booleans	+15	
D	Correctly parse \<mid-statement\>s composed of only integers	+10	No variable is used on the right side of the statement (after degeri)
E	Correctly parse \<mid-statement\>s composed of combination of integers, floats, booleans	+15	No variable is used on the right side of the statement (after degeri)
F	Correctly parse \<mid-statement\>s composed of only integers and integer variables	+15	This requires also clearing B
G	Correctly parse \<mid-statement\>s composed of any operand	+15	This requires also clearing C
X	Correctly parse any file	+15	This requires also clearing G

Late Submission: Allowed with penalty: -% 10*(number_of_days_late)^2. Example case: You are 2 days late, and you got 90 from evaluation. You will get 90 * (1 - 0.4) = 54 as your final grade. You will get 0 if you are more than 3 days late.

Example calc.in files (more will be provided)

```
AnaDegiskenler
x degeri 4 olsun
x1 degeri 2 olsun
a degeri    dort olsun
b degeri uc nokta dort olsun
y degeri 8 olsun
z degeri 3.2 olsun
b1 degeri dogru olsun
b2 degeri yanlis olsun


YeniDegiskenler
```

```
t1 degeri x + ( y ) - z olsun
t4 degeri x arti ac-parantez y kapa-parantez eksi z olsun
t2 degeri ( t4 +  ac-parantez ( ( y  ) ) - z ) kapa-parantez olsun
t3 degeri b1 ve b1 ve ( b2 veya b1 ) olsun

Sonuc
x arti ac-parantez y kapa-parantez eksi z
```

```
AnaDegiskenler
YeniDegiskenler
Sonuc
```