trees

CMSI 386 Homework #4

Zane Kansil & Edward Bramanti

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1. Write Regular Expressions for:

   (a) Canadian Postal Codes:

   ```
   [^DFIOQUWZ][\d][^DFIOQU] [\d][^DFIOQU][\d]
   ```

   (b) Legal Visa Card Numbers, not including checksums

   ```
   4\d{3} (\d{4} ){3}
   ```

   (c) MasterCard Numbers, not including checksums

   ```
   5\d{3} (\d{4} ){3}
   ```

   (d) Ada 95 numeric literals

   ```
   \d(_?\d)*#[\dA-F](_?[\dA-F])*#(E[+-]+[\dA-F](_?[\dA-F])*)?|\d(_?\d)*(\.\d(_
   ```

   (e) Strings of letters and numbers beginning with a letter, EXCEPT those strings that are exactly three letters ending with two Latin letter ohs, of any case.

   ```
   ^\w(?![Oo][Oo]$)[\w\d]*
   ```

2. Syntax tree for Program in JSON (http://cs.lmu.edu/ ray/notes/syntax/)

```
{
    "Program" : [
        {"Var" : "x"},
        {"Var" : "y"},
        {"While" : [
            {"Minus" : ["y", 5]},
            [
                {"Var" : "y"},
                {"Read" : "x"},
                {"Read" : "y"},
                {"Assign" : ["x", {
                    "Times" : [2, {
                        "Plus" : [3, "y"]
                    }]
                }]}
            ]
        ]}
        {"Write" : 5}
    ]
}
```

3. In the Ada language comments are started with "–" and go to the end of the line. Therefore the designers decided not to make the unary negation operator have the highest precedence. Explain why this choice was made. Also, give an abstract syntax tree for the expression -8 * 5 and explain how this is similar to and how it is different from the alternative of dropping the negation from EXP2 and adding - EXP5 to EXP4. The designers made this choice so that you can have a `NEG - POS` or a `NEG + POS`, but never a `POS | NEG  NEG`. Therefore, it is possible...