

Exercise 5

-22**

A) evaluating to 4. ($-2^{**2} \rightarrow 4$)

```
Exp      = Term
Term     = Factor ("**" Factor)*
Factor   = "-" Primary -- negate
          | Primary
Primary  = number
```

B) Evaluating to -4 ($-2^{**2} \rightarrow -4$)

```
Exp      = Term
Term     = Factor ("**" Factor)*
Factor   = Primary
          | "-" Factor -- negate
Primary  = number
```

c) Can be a syntax error, which allows (-2^{**2}) and $-(2^{**2})$ to be legal

```
Exp      = Term
Term     = Factor ("**" Factor)*
Factor   = Primary
          | "-" PrimaryNotExponent -- negate
PrimaryNotExponent = number | "(" Exp ")"
Primary    = number | "(" Exp ")"
```

Exercise 6

```
AstroPP {
  Program = Statement*

  Statement = IfStatement
            | WhileStatement
            | BreakStatement
            | Assignment
```

```

        | Expression

IfStatement = "if" "(" Expression ")" Block ( "else" ( Block |
IfStatement ) )?

WhileStatement = "while" "(" Expression ")" Block

BreakStatement = "break"  -- only valid inside while

Assignment = identifier "=" Expression

Expression = Expression RelOp Expression  -- relational
operators
        | Term

Term        = Term ("+" | "-") Factor
        | Factor

Factor      = Factor ("*" | "/") Primary
        | Primary

Primary     = number
        | identifier
        | "(" Expression ")"

Block       = "{" Statement* "}"

RelOp       = "==" | "!=" | "<" | ">" | "<=" | ">="  -- non-
associative relational ops

identifier = letter (letter | digit)*
number = digit+
}

```