Formal Methods in Software Development
Exercise 3
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Submit the results as a single PDF file in the Moodle interface of this exercise.

1. Solve either Variant A or Variant B of this part of the exercise:

   - **Variant A:** Construct two programs Prg1 and Prg2 for evaluating $R=X^Y$ (X, Y are natural numbers): a simple one written in pure EL and a more elaborated one written in extended EL in which a function (Y *div* 2) and a predicate *odd*(Y) can additionally be used.

     As for the more elaborate version, use the technique of "Exponentiation by Squaring" (in German: "Binäre Exponentiation") which is widely described on the web.

   - **Variant B:** Construct two programs Prg1 and Prg2 for evaluating $R=X*Y$ (X, Y are natural numbers): a simple one written in restricted EL (without multiplication function *) and a more elaborated one written in extended EL in which a function (Y *div* 2) and a predicate *odd*(Y) can additionally be used.

     As for the more elaborate version, use the technique of "Egyptian Multiplication" (in German: "Russische Bauernmultiplikation") which is widely described on the web.

2. Transform Prg1 and Prg2 into semantic terms STR_1 and STR_2 of EL and extended EL program algebras respectively.

3. "Test" the obtained semantic terms on 2 different states taking into account that program loops should be evaluated at least 2 times.