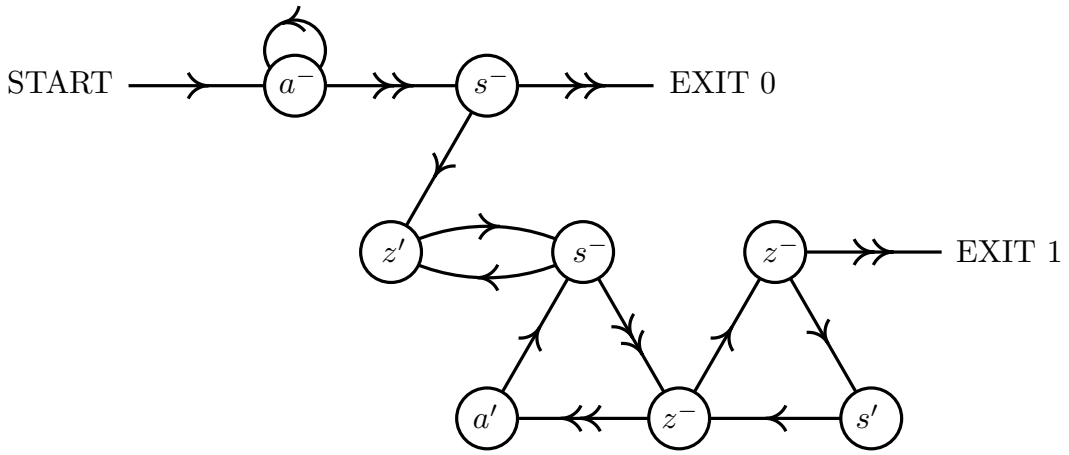
1999 Paper 10 Question 11

Computation Theory

Define computation by a register machine, explaining the action of the program. [4 marks]

What is meant by the *current configuration* during a register machine computation? [2 marks]

In the following program, assume that register Z holds 0 initially. What is its effect?



[2 marks]

Show how to encode a general register machine program and the initial configuration of one of its computations into a pair of natural numbers. [6 marks]

Outline the design of a register machine that simulates a general register machine computation specified by a single natural number. Your machine should take appropriate action for all possible inputs. [6 marks]