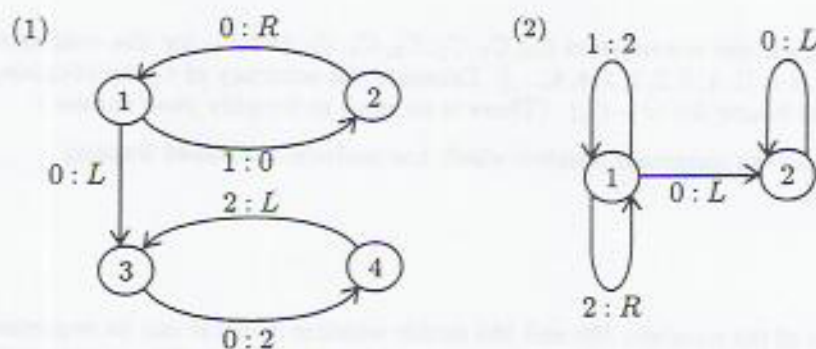


Question 9

- (i) We wish to design a Turing machine which, using monadic notation, takes as input a positive integer n in standard position (on an otherwise blank tape) and which halts scanning the leftmost of a string of n 2s on an otherwise blank tape.
- (a) Explain why each of the Turing machines below is *not* suitable for this task. (Your answer may include sequences of configurations for appropriate test data.)



- (b) Give the flowgraph of a Turing machine which correctly performs the task. [4]
- (ii) Give the complete flowchart of an Abacus machine program which has the effect shown in the following block diagram. (You may use extra registers, assumed empty initially, if you wish.) [2]

