1. Design a circuit that finds the square root of an 8-bit number using the method of subtracting odd integers. To find the square root of N, subtract 1, then 3, then 5, etc. without the result going negative. The number of subtractions is the square root of N.

a) Illustrate the method for N = 37.
b) Draw a block diagram of the square root circuit that includes register RegN, a subtractor/comparator, a register ODD, and a control unit. Define the control signals used in the diagram.
c) Draw the state graph for the control unit. Register RegN should be loaded when Start = 1 and a Done signal should indicate completion.
d) Write a complete VHDL model (entity and behavioral architecture) for the square root finder. Use at least two processes: one to generate the control signals and one to update the registers based on those signals.
e) Simulate the circuit using N = 37 and N = 9.