

2005 Paper 2 Question 8

Software Engineering II

You are asked to design a new product – a speed and distance computer to be mounted on the handlebars of a bicycle. The hardware includes two control pushbuttons, an LCD screen and a rotation sensor on the bicycle wheel. The device will have three normal operating modes: display of the current speed and distance travelled today; a graph of distance travelled on each day of the week; and a graph of average speed plotted against day of the week. It will be powered by stored energy from the rotation sensor. As stored energy becomes depleted, power management functions should first save data to non-volatile memory, then turn off the screen, and as a last resort shut down clock functions.

- (a) Draw preliminary diagrammatic software design models (i.e. not complete designs) suitable for:
- (i) presenting functionality to a potential customer;
 - (ii) planning data storage and manipulation;
 - (iii) analysing power management modes; and
 - (iv) defining the procedure for plotting the speed graph. [3 marks each]
- (b) For *each* of these models, name a different technique that could be used to verify that it is correct. [4 marks]
- (c) For part (a)(iv) only, suggest good names for *four* variables that would be used in implementing the procedure, indicating what rôle each variable plays. [4 marks]