1.

5.0 1.8 6.2 2.8 3.0 4.0 3.8 2.4 0.6 0.8 7.8

The numbers in the list are the lengths, in feet, of eleven pieces of wood. They are to be cut from planks of wood of length 10 feet. You should ignore wastage due to cutting.

(a) Calculate a lower bound for the number of planks needed. You must make your method clear.

(2)

(b) Use the first-fit bin packing algorithm to determine how these pieces could be cut from 10 feet planks.

(3)

(c) Carry out a quick sort to produce a list of the lengths in descending order. You should show the result of each pass and identify your pivots clearly.

(4)

(d) Use the first-fit decreasing bin packing algorithm to determine how these pieces could be cut from 10 feet planks.

(2)

(Total for Question 1 is 11 marks)