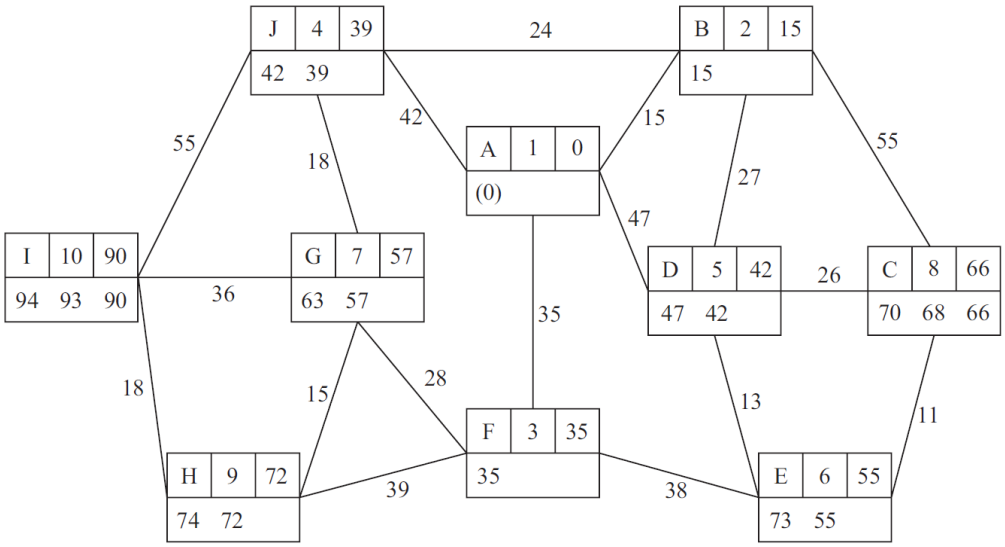
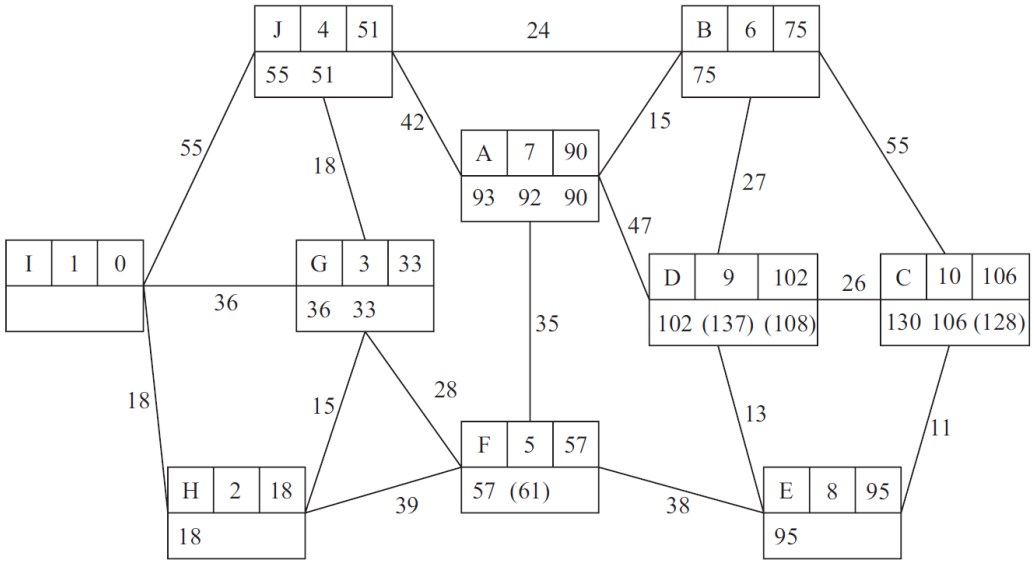
	If just considering $n = 50$ must also show that $n = 51$ uses 3 bins when using the algorithm e.g. by stating that 11 fits in bin 2 and 7 in bin 3 Concludes that $n = 50$ (there must not be any incorrect statements or working seen)	

Question Number	Scheme	Marks
4.(a)	Use Dijkstra to find the shortest route from A to C and from A to I and add these together	B2, 1 **(2)**
(b)		M1 A1 (ABFJ) A1 (DEG) A1ft (CHI)
	Quickest route is IHGJBABDEC	A1
	Length of quickest route is 90 + 66 = 156 (minutes)	A1ft **(6)**
		8 Marks

	Notes for Question 4
a1B1	A general idea of finding the route from A to C and from A to I (accept if stated as I to A or C to A)
a2B1	A complete explanation which uses Dijkstra's algorithm throughout, with both sections starting at A, including combining the two sections of the route
	In (b) it is important that all values at each node are checked very carefully – the order of the working values must be correct for the corresponding A mark to be awarded e.g. at G the working values must be 63 57 in that order (so 57 63 is incorrect) **It is also important that the order of labelling is checked carefully. The order of labelling must be a strictly increasing sequence – so 1, 2, 3, 3, 4, … will be penalised once (see notes below) but 1, 2, 3, 5, 6, … is fine. Errors in the final values and working values are penalised before errors in the order of labelling** **If the order of labelling and final values have been swapped penalise with the loss of the first A mark earned.**
b1M1	A larger value replaced by a smaller value at least twice in the working values at either C, D, E, G, H, I or J
b1A1	All values at A, B, F and J correct and the working values in the correct order
b2A1	All values at D, E and G correct and the working values in the correct order
b3A1ft	All values in C, H and I correct and the working values in the correct order. Follow through on the values at C and I only. The working values at C must follow from the final values at B, D and E and the working values at I must follow from the final values at J, G and H.
b4A1	CAO – do not accept the route in reverse
b5A1ft	Their "156" - this must be the sum of their final values at I and C (Accept if the route and distance have been written on the wrong lines)

	Special Case – starting from I max 3 marks	
(b)		M1 A1 (IHGJF) A1 (BAEDC) A0
	Mark unavailable	A0
	Mark unavailable	A0 **(6)**
	Notes for Special Case	

b1M1	A larger value replaced by a smaller value at least twice in the working values at either G, J, A or C
b1A1	All values at I, H, G, J and F correct and the working values in the correct order
b2A1	All values at B, A, E, D and C correct and the working values in the correct order
b3A0	Mark unavailable
b4A0	Mark unavailable
b5A0	Mark unavailable