3BA2Tutorial

Stochastic Search

1. A commercial traveller has to visit customers in Dublin, Galway, Tullamore, Longford and Kilkenny. She is currently in Dublin and needs to determine the order to do the visits that will minimise time spent travelling. She can come back to Dublin at her leisure. The following matrix shows the estimated time between towns:-

	DB	TM	KK	LD	GY
DB	-	80	100	130	200
TM	80	-	50	70	130
KK	100	50	-	160	170
LD	130	70	160	-	110
GY	200	130	170	110	-

If this problem is to be solved using Branch & Bound Search show the order in which branching will be done until the first complete candidate solution is found. Show the partial solutions that can be bound out at this stage.

2. (a) A map colouring problem involves determining colours for regions in a map so that adjacent regions do not have the same colour. Consider for instance the problem of colouring a map of the counties of Ireland – Dublin and Kildare should not have the same colour. Describe in outline how a Genetic Algorithm (GA) solution to this problem might be structured – consider a solution where only 4 colours are to be used.

(b) Propose a representation for the possible solutions in this GA showing how crossover and mutation might work.

(c) Propose a fitness function for use in this GA.