Math 3210 Programming Assignment

Please submit the answer on or before **19/12/2104** in person to the TA. You have to demonstrate the program in front of the TA upon the submission of the program and the TA will ask 3-4 questions regarding the statements in your program. Please hand in the program earlier to avoid long waiting time.

Content:

The coach of a swimming team needs to assign swimmers to a 200 yards medley relay team to send to the Junior Olympics. Since most of his best swimmers are very fast in more than one stroke, it is not clear that which swimmer should be assigned to each of the four strokes. The five fastest swimmers and the best time they have achieved in each of the stroke are as follows:

	Carl	Chris	David	Tony	Ken
Back	37.7	32.9	33.8	37	35.4
Breast	43.4	33.1	42.2	34.7	41.8
Butterfly	33.3	28.5	38.9	30.3	33.6
Freestyle	29.2	26.4	29.6	28.5	31.1

The coach wants to assign four different swimmers to each of the four strokes such the total time is minimized.

Question 1)

Formulate the problem into a linear programing problem, i.e with constraints in the form $Ax = b$ and with the objective function in the form $c^T x$. Figure out how many variables are there in total.

Question 2)

Write a program/Excel spread sheet that solves the problem above. Involve the following properties in your program

1) The final allocation of the strokes.
2) The total time required.
3) The program should be flexible in a way that if we want to decrease the number of strokes required, (e.g when it is turned into a 3x50 meters relay with free style, butterfly and breast only), it can still allocate the best swimmers to minimize the time.

Question 3) (Open ended question)

Discuss on the meaning of the dual problem of this problem. What are the dual variables and what is the dual problem maximizing?

Note: You can use any programing language such as Matlab, VBA, C and Excel.