

## Instance based Learning Exercise

### Question:

In a laparoscopic surgical tool detection task, it is known that the surgical tool components come from one of two classes,  $C_1$  or  $C_2$ . Each sample of a surgical tool component  $Y$  has two features,  $Y = (y_1, y_2)$ . An experiment has collected 6 samples and their feature values and classification are shown in the following table. Answer the following questions by showing details of the working process. An answer without the working process will not receive any marks.

$Y = (y_1, y_2)$		Classification
$y_1$	$y_2$	C
3	3	$C_2$
8	8	$C_1$
3	5	$C_2$
5	4	$C_2$
6	5	$C_1$
7	6	$C_1$
6	3.5	=?

Using the data with known classification, design a KNN classifier with  $K=3$  to classify the unknown sample  $Y=(6, 3.5)$  in the last row of the table.