School of Computing and Information Systems
The University of Melbourne
COMP90049 INTROCTION to MACHINE LEARNING
(Semester 1, 2021)

Week 5

1. How is **holdout** evaluation different to **cross-validation** evaluation? What are some reasons we would prefer one strategy over the other?

2. A **confusion matrix** is a summary of the performance of a (supervised) classifier over a set of development ("test") data, by counting the various instances:

		Actual			
		a	*b*	*c*	*d*
Classified	*a*	10	2	3	1
	b	2	5	3	1
	c	1	3	7	1
	d	3	0	3	5

(i). Calculate the classification **accuracy** of the system. Find the **error rate** for the system.

(ii). Calculate the **precision**, **recall** and **F-score** (where $\beta = 1$) for class *d*.

(iii). Why can't we do this for the whole system? How can we consider the whole system?

3. For the following dataset:

ID	*Outl*	*Temp*	*Humi*	*Wind*	PLAY
TRAINING INSTANCES					
A	s	h	h	F	N
B	s	h	h	T	N
C	o	h	h	F	Y
D	r	m	h	F	Y
E	r	c	n	F	Y
F	r	c	n	T	N
TEST INSTANCES					
G	o	c	n	T	?
H	s	m	h	F	?

(i). Classify the test instances using the method of **0-R**.

(ii). Classify the test instances using the method of **1-R**. (for H assume O*utl* = *s*)

4. Given the above dataset, we wished to perform feature selection on this dataset, where the class is PLAY:

(i). Which of `Humi` and `Wind` has the greatest *Pointwise Mutual Information* for the class Y? What about N?

(ii). Which of the attributes has the greatest *Mutual Information* for the class, as a whole?