

CURTIN UNIVERSITY OF TECHNOLOGY (CRICOS number: 00301J)
Division of Engineering, Science and Computing
Department of Computing

Theoretical Foundations of Computer Science 300 (Index No. 12334)

Work Sheet 9

AIM:

To determine Time Complexity.

ACTIVITY 1: Big O Notation

OBL Outcome: *Define and describe* P and NP computation time problems, and *explain* their relationship and applications.

- *Evaluate* the Polynomial time order of an algorithm.

Do exercise 7.1 from the text (p294).

ACTIVITY 2: Understanding SAT

OBL Outcome: *Define and describe* P and NP computation time problems, and *explain* their relationship and applications.

- *Define and relate* the P and NP classes.

$SAT = \{ \langle A \rangle \mid A \text{ is a satisfiable Boolean formula} \}$ is an NP complete problem. This activity is meant to improve your understanding of what is meant by a *satisfiable Boolean formula*.

Do exercise 7.5 from the text (p294).

ACTIVITY 3: Polynomial Time

OBL Outcome: *Define and describe* P and NP computation time problems, and *explain* their relationship and applications.

- *Evaluate* the Polynomial time order of an algorithm given an Implementation Level Description of the Turing Machine that solves it.

Do exercise 7.9 from the text (p295).

(In First edition: exercise 7.9 was 7.10.)

ACTIVITY 4: NP Time Complexity

OBL Outcome: *Define and describe* P and NP computation time problems, and *explain* their relationship and applications.

- *Define and relate* the P and NP classes.

Do exercise 7.11 from the textbook (p295).

End Of Work Sheet 9