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)
Theoretical Foundations of Computer Science 552 (Index No. 302976)

Work Sheet 7

AIM:

- To show that a problem is undecidable through reduction proof.

You may undertake the work in this worksheet as a group activity; however each student is individually responsible for their own learning. The worksheet will not be submitted or marked, and no answers will be given directly. The questions in this sheet will be discussed in the tutorial in week 8 of semester.

ACTIVITY 1: Discussion Questions

a) What are the different methods for proving that a problem is undecidable? Compare and contrast them.
b) What is the best language to reduce a problem to when proving undecidability?

ACTIVITY 2: Undecidability

For each of the following problems either show that the problem is decidable as per Worksheet 6, or show that it is undecidable using proof by reduction.

a) The complement of E_{TM}. (Bonus question – what does this say about E_{TM}?)
b) EQ_{TM}.
c) EQ_{CFG}.

End of Work Sheet 7