

COMP3506/COMP7505—Algorithms and Data Structures

School of Information Technology and Electrical Engineering

Week 2 Tutorial

Question 1. Software engineering has a variety of objectives including reliability, utility, flexibility (portable and adaptable) and efficiency (in programmer effort and/or machine space and time complexity).

- a. Give an example of a life-critical software application.
- b. Give an example of a simple portable device containing a computer and an application that would be useful to run on it.
- c. Give an example of an application that processes terabytes of data.

Question 2. Discuss how the design decisions for choosing algorithms for each application in Question 1 might result in different space and time tradeoffs.

Question 3.

Compare and contrast the terms Abstract Data Type and Concrete Data Type.

Question 4.

Specify an ADT in Java using the *interface* construct (you name the interface). The ADT should specify a method (you name the method) that takes a String parameter and returns its length as an int.

Question 5.

Now specify the interface described in Question 2 using a *generic* interface that specifies the parameterised type *E*. The method should take as a parameter an object of the parameterised type and return an *int* as the length.

Note: In Java all objects must implement the "toString" method. Therefore an implementation is able to call the "toString" method on any object to convert it to a string, then is able to find the length of that string and return it.