Arrays

COMPI400 – Week 4
Section 4.16 in Barnes and Kölling textbook
Grouping Data

• An array is a group of elements that all have the same type

• Objects group elements of different types
Objects

class Student
{
  int studentId;
  String studentName;
  int mark;
  ...
}

Accessing Elements

• Array elements are accessed by their position in the array

• Object fields are accessed by name, e.g.

  ```java
  Student fred = new Student();
  fred.studentID = 3412345;
  ```

• We’ll come back to this soon
Creating Arrays

- Type declaration
  - E.g. `int[] data;`
  - Indicates array type: `int[]`
  - Variable name: `data`

- Declares an array of integers
Creating Arrays

// Create an integer array
// with five elements
int[] intArray = new int[5];
Creating Arrays

// Create an array of floats
// with ten elements
float[] floatArray = new float[10];
Creating Arrays

// Create an array of Strings
// with ten elements
String[] strArray = new String[10];
Creating Arrays

// Create an array of Students
// with ten elements
Student[] stuArray = new Student[10];
Accessing Array Elements

- For an array of length $n$
- Array elements are numbered 0 to $n-1$
- E.g.

  - `data[0]` is the first element
  - `data[1]` is the second, etc
Accessing Array Elements

- Trying to access an element outside the range $0 \ldots n-1$ results in an error
Initialising an Array

// Initialise array
int[] test = {5, 2, 7, 9, 4, 6, 8};
Array Indexing

• The index expression can be anything that yields a non-negative integer
  
  \[ \text{data}[i+1] \]
  
  \[ \text{data}[\text{intArray}[i]] \]
Array Assignment

data[i] = 3;
data[i] = 2 + 9;
data[i] = R[j] + R[k];