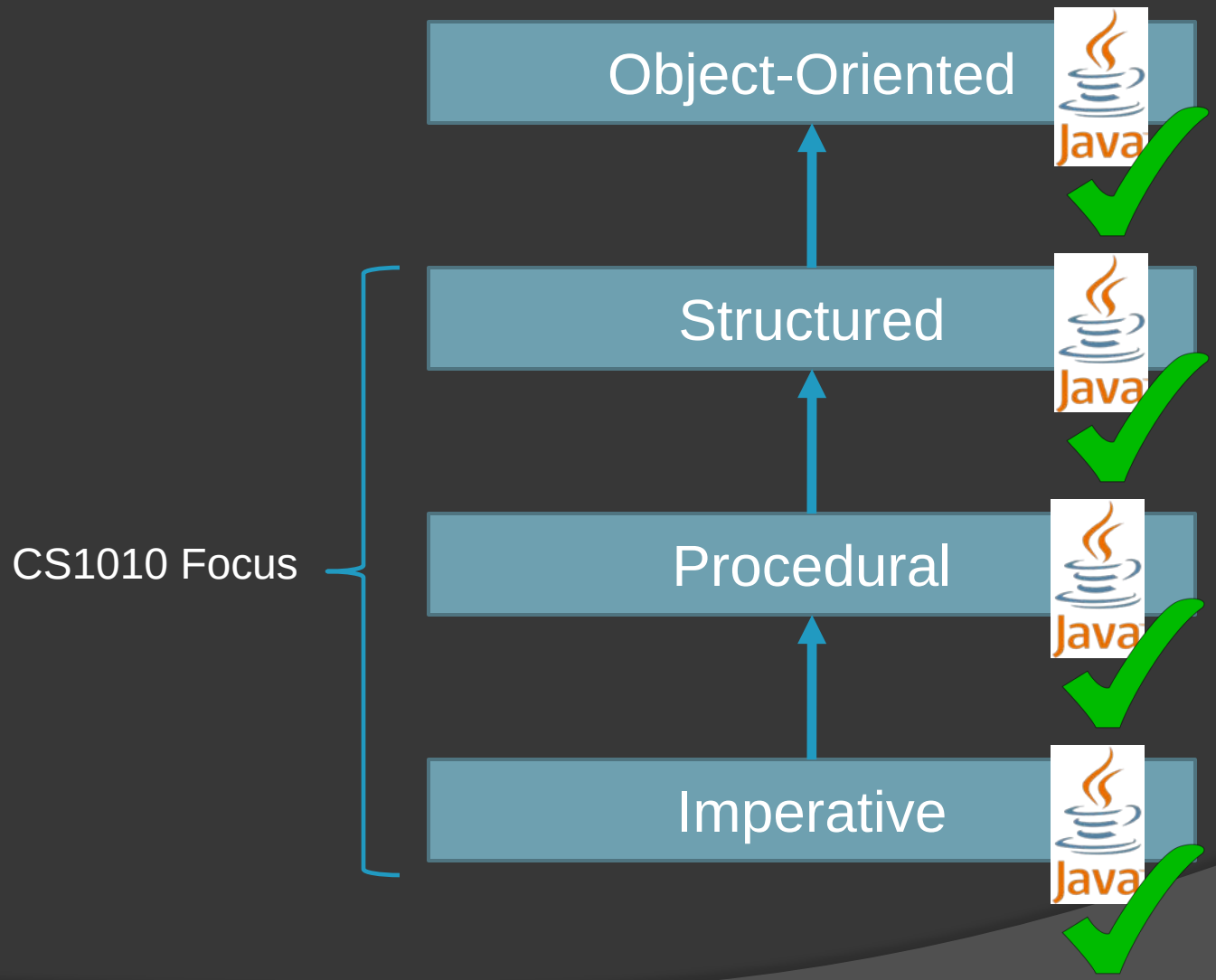
THE CASE FOR JAVA

First Programming Language: The Perspectives
5th SoC Teaching Luncheon – 12th May 2011
Tan Wee Kek

Why Java as the First Programming Language?

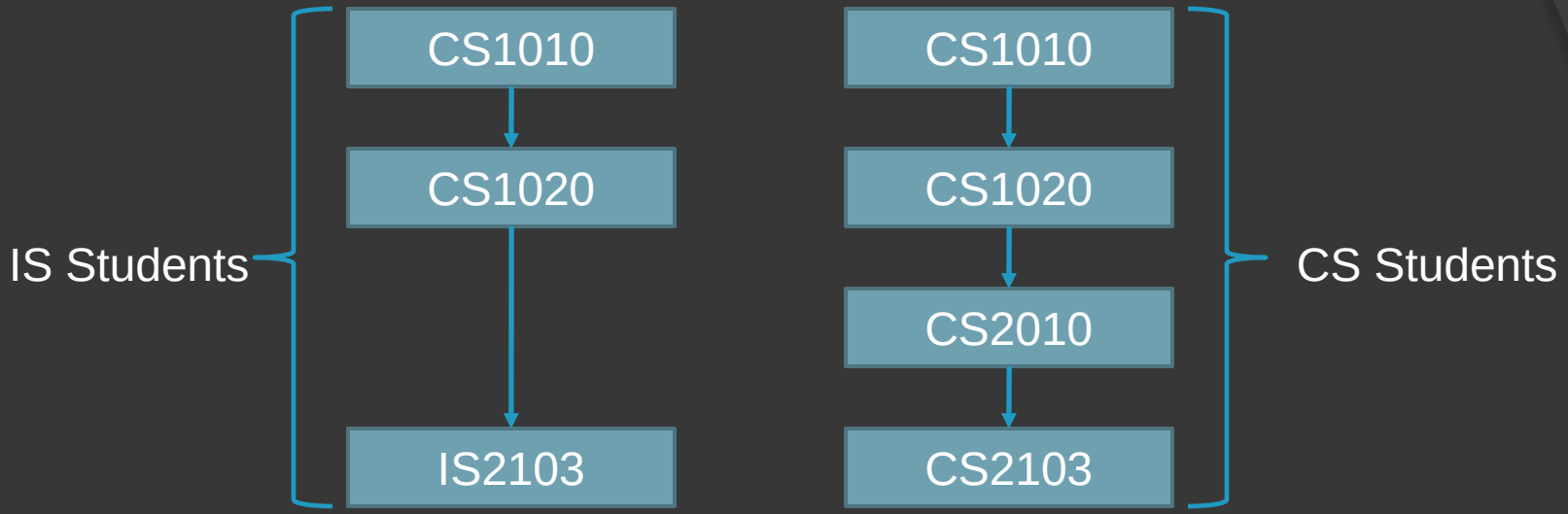
1. Programming Paradigm



2. Suitability as First Programming Language

- No memory management issues:
  - Pointer bugs.
  - Memory leaks.
- May be considered more strongly typed than C:
  - `int *ptrInt = malloc(sizeof(int));`
  - `struct XXX *ptrStruct = malloc(sizeof(struct XXX));`
  - `ptrInt = ptrStruct;`
  - `(struct XXX*)ptrInt…`
- More exhaustive compile time and runtime checks:
  - Java flags uninitialized variable as error and no executable is generated.

3. Time Constraint



- IS students read only two courses prior to CS2103 equivalent.
- Upper levels IS courses are mainly managerial-based.
- Given the time constraint, we would prefer IS students to start with Java and excel in Java.

4. Capstone Requirement

- IS students read IS3102 as capstone, which requires excellent knowledge of Java development.
- EC students read IS4102, which offers Java EE as one of the core development options.

5. Pragmaticality

- Enterprise-class business information systems are mainly web-based and Java remains one of the best Web language.
- Java is friendly to modern system architectures:
  - Multitier Architecture.
  - Service Oriented Architecture.
- Cross platform and cross device:
  - Desktop – Java SE
  - Mobile – Java ME
  - Web/Enterprise – Java EE
  - One language for everything ☺

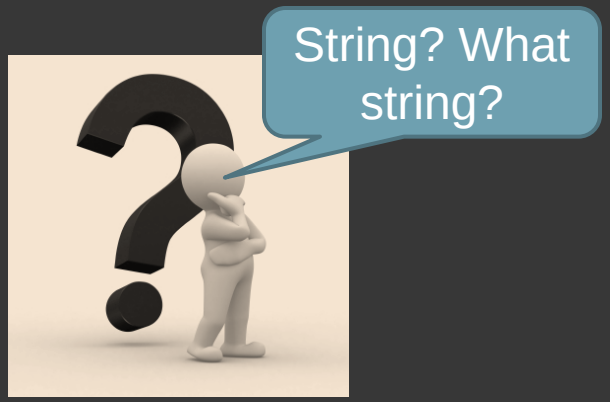
6. Perfect Business Sense

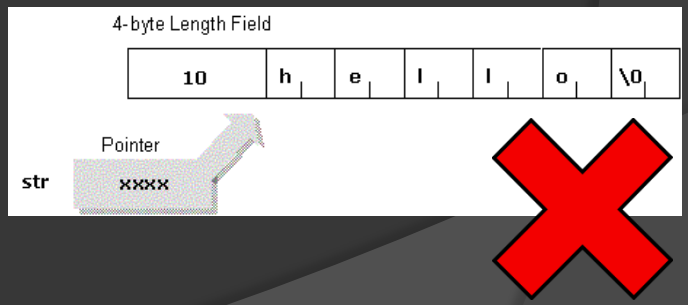
- IS students mostly end up in business application development jobs, that is if they even choose development ;)
- Top two competing mainstream development platforms, at least locally, are Java and .NET.
- Ease of conversion from Java to C#.NET
- Again, we would prefer IS students to start with Java and excel in Java.

Challenges of Imparting Programming to IS Students and the Associated Implications

1. Handicapped by “Hardcore Programming”

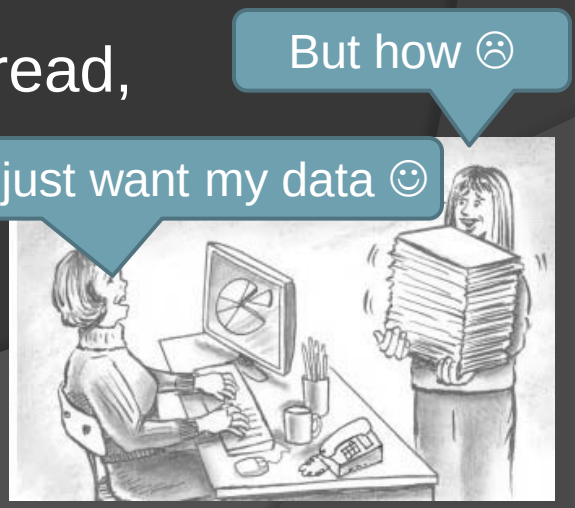
- Case Study: String
  - Prefer a string to be literally a string ☺
  - Handicapped by NULL termination ☹
  - Handicapped by array and pointer ☹
- In this sense, Java is preferred ☺





2. Preference for Solving the Business Problem

- Case Study: File Manipulation
  - Focus on what is relevant to the business, i.e., read the contents and create business value out of it.
    - In Java – bufferedReader.readLine(); ☺
  - Not figuring out how to read the contents.
    - In C – fgetc, fgets, fgetwc, fgetws, fread, fscanf, getc, getchar, gets??? ☹
  - In this sense, Java is preferred ☺



3. “The Tailor Makes the Man”

- Case Study: Graphical User Interface (GUI)
  - Usability and aesthetic aspects of GUI are critical success factors for business software.
  - Java supports both desktop and web GUI development ☺
  - C supports desktop GUI (Win32, GTK+) ☺
  - Console is certainly good for teaching programming but we wish we could impress students that GUI is an important part of problem solving at an early stage.

4. Minimize Reinventing the Wheel

- Case Study: Open Source / Open APIs
  - Provide value-added features to solve business problems;
  - Not build tools to provide the features.
  - Java is friendly to APIs for analytics, social networking, etc ☺
  - May not be fair to compare with C.
  - But in this sense, we would prefer students to be proficient in Java and explore further with Java.