A. support for abstraction

Readability: good with readability, because it's easier to read without complex details.

Writeability: good with writeability, because you able to use functions without details.

Reliability: good with reliability, because with reliable abstraction you'll have less errors.

B. Orthogonality

Readability: good with readability, fewer exceptions combination the easier you can read.

Writeability: good with writeability, because by providing a more flexible and expressive language

Reliability: good with reliability, because fewer combination the less exceptions.

C. Pointers in C and C++

Readability: bad in readability, harder to read and know where the pointer points at.

Writeability: good with writeability, as they allow us to use vars, array, objects using their address in memory

Reliability: bad in reliability, as mistakes can happen when we use arithmetic pointers.

Compare between java, C++:

Readability: java is more readable, has simplicity design and easy to read. C++ 'mentioned above'.

Writeability: C++ is better, we use pointers, 'mentioned above'.

Reliability: java is better, has type checking, exception handling and indexing, it checks if array index is out of bound or not, while C++ 'mentioned above'.

Portability: java is better; you can compile it to an intermediate language (byte code) then JVM will translate it any machine you want. In C++ you have to recompile it.

Cost of execution: C++ is better, java is strong checking language, for example, it checks if array index is out of bound, this increase the cost, while C++ doesn't check.

C++ translate directly into machine code, while java translate to intermediate language then to machine, this increase cost.

Why were modular languages developed?

- To support huge applications.

- Divide and conquer approach for developers.

- Data abstraction.

discuss how the Von Neumann architecture influenced the design of programming language?

- Data and programs stored in memory
- Memory is separate from CPU
- Instructions and data are piped from memory to CPU
- Basis for imperative languages
  - Variables model memory cells
  - Assignment statements model piping
  - Iteration is efficient → done by changing the program counter (PC).
  - * Selection and branching statments (like if, switch).

They appear as a result of von Neumann architecture

2nd Term 2020-2021

Department of Computer Science

King Saud University

mid 1-1

St. Name:

St. Number

Q1) (14 marks) Put a circle around the symbol of the best answer for each of the following

1) Which of the following features must be available in a programming language to be suitable for writing embedded systems
   - [✓ a.] Provide constructs for low-level control over hardware.
   - b. Use floating point representation
   - c. Have features to analyse data
   - d. All of the above.

2) An orthogonal programming language
   - a. Has a relatively small set of primitive constructs that can be combined in a relatively small number of ways to get the desired results.
   - b. Has a fewer number of exceptions because every possible combination is legal.
   - c. Is good with respect to reliability
   - [✓ d.] All of the above

3) Which of the following features a programming language need to have in order to be good with respect to reliability
   - a. Data types
   - b. Support for abstraction
   - c. Exception handling
   - [✓ d.] all of the above

4) Having a small number of manageable features and constructs, makes a programming language good with respect to
   - a. Readability
   - b. Writability
   - c. Reliability
   - [✓ d.] All of the above

5) A language with too many operators and special symbols is
   - a. good with respect to writability
   - b. bad with respect to reliability
   - c. bad with respect to readability
   - [✓ d.] all of the above

6) Java is partly compiled and partly interpreted (hybrid implementation) makes is
   - [✓ a.] Good for writing portable programs
   - b. Good for writing efficient programs
   - c. Good for reducing the cost of training
   - d. All of the above

7) Classes, inheritance and polymorphism designed in programming languages as a result of
   - a. The Von-Neumann architecture
   - [✓ b.] Programming methodologies
   - c. People preferences
   - d. None of the above

18/38

Programming Language Compilation
Sample Exam Questions
CSC 340
Mid-1 2nd Term 2021-2022

Studen[redacted]

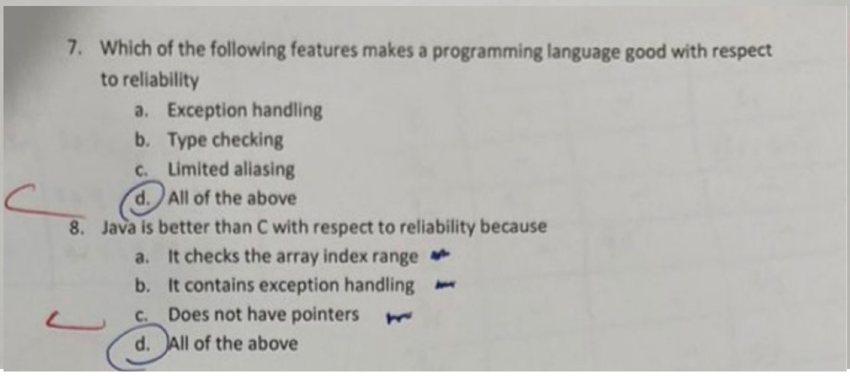
Student Section: 9 - 10

Q1 (10 grades) Put a circle around the most appropriate answer for each of the following

1. Orthogonality makes a programming language good with respect to
   a. Readability
   b. Writability
   c. Reliability
   [✓ d. All of the above] ✓
2. The ability to use pointers in C++, makes the language
   [✓ a. Good with respect to writability but bad with respect to reliability] ✓
   b. Good with respect to reliability but bad with respect to writability
   c. Good with respect to reliability and writability
   d. Good with respect to readability but bad with respect to reliability
3. The fact that Java checks the range of array indices, makes the language
   a. Good with respect to writability but bad with respect to reliability
   b. Good with respect to the cost of execution but bad with respect to reliability
   [✓ c. Good with respect to reliability but bad with respect to the cost of execution] ✓
   d. None of the above
4. We usually prefer to stop adding features to an existing language, and begin a new one to
   a. Reduce the cost of re-training programmers
   [✓ b. make use of the most recent development in the field of programming languages] ✗
   c. Reduce the cost of writing a program
   d. Increase reliability

if prodictivity of new > cost of treining. we use the new

5. Java uses a combination of compilation and interpretation to
   a. achieve portability and reduce the cost of translation
   b. reduce the cost of training programmers
   c. improve reliability and writability
   [✓ d. all of the above] ✗
6. Which of the following features make a programming language suitable for scientific applications
   [✓ a. Floating-point representations] ✓
   b. Data persistency
   c. Low level control on hardware
   d. All of the above



7. Which of the following features makes a programming language good with respect to reliability
   a. Exception handling
   b. Type checking
   c. Limited aliasing
   [✓ d. All of the above] ✓
8. Java is better than C with respect to reliability because
   a. It checks the array index range
   b. It contains exception handling
   c. Does not have pointers
   [✓ d. All of the above] ✓