CSc 372 Quiz 3: SML and Types Participation Quiz

Name	
UA Email	

This is a participation quiz and will be graded based on completion, not on accuracy. However, please do attempt to answer the questions as best you can so that I get an idea of where you are starting the semester with these concepts. Put a `?` for questions you have no idea on.
Sources: reading assignments, ChatGPT conversation 22 Jan 2025

Question 1. Fill in the blank.

Spaced repetition = [   ] + [   ]

Question 2. Put the letter for the best answer or a ? in this box ……………………….......[ ]
What is the primary tradeoff surrounding automatic garbage collection in programming languages?
   A. It improves performance in all systems but makes code harder to write.
   B. It saves programmer time but isn't ideal for real-time systems due to unpredictability.
   C. It eliminates memory leaks completely, but requires additional training for programmers.
   D. It reduces the cost of hardware but increases the energy consumption of software.

Question 3. Put the letter for the best answer or a ? in this box ……………………….......[ ]
Which of the following is **NOT** a good technical criterion for evaluating programming languages?
A) Ease of reading   B) Expressiveness   C) Portability
D) Possibility of efficient target code generation   E) Popularity of memes about the language

Question 4. Put the letter for the best answer or a ? in this box ……………………….......[ ]
Which of the following statements best describes the tradeoff between static typing (as in ML) and dynamic typing (as in Python), based on the Chapter 1 reading?
   A. Static typing allows lists to mix elements of different types, but dynamic typing enforces stricter compile-time checks.
   B. Static typing requires compile-time type checking, catching errors early, while dynamic typing (as in Python) offers flexibility at the cost of increased runtime error debugging.
   C. Static typing provides more runtime flexibility by ignoring irrelevant components, while dynamic typing focuses on catching errors automatically.
   D. Static typing enforces runtime checks for type consistency, while dynamic typing allows compile-time polymorphism for greater flexibility.

Question 5. Put the letter for the best answer or a ? in this box ……………………….......[ ]
What is the primary difference between the unit type (as in ML) and the void type (as in C)?
   A. Unit has a value; void does not.
   B. Unit is a type; void is not.
   C. Unit is runtime; void is compile-time.
   D. Unit is dynamic; void is static.

Questions 6 and 7 refer to the following SML code:

```
fun describeList [] = "The list is empty"
  | describeList [x] = "The list has one element: " ^ Int.toString x
  | describeList (x :: y :: []) =
        "The list has two elements: " ^ Int.toString x ^ " and "
        ^ Int.toString y
  | describeList _ = "The list has more than two elements"
```

Question 6. Put the letter for the best answer or a ? in this box …………………………....☐

What will `describeList [ ]` return?

    A. "The list has one element: 0"

    B. "The list is empty"

    C. "The list has more than two elements"

    D. "The list has two elements: 0 and 0"

Question 7. Put the letter for the best answer or a ? in this box …………………………....☐

What will `describeList [5,6,7]` return?

    A. "The list is empty"

    B. "The list has one element: 5"

    C. "The list has two elements: 5 and 6"

    D. "The list has more than two elements"

Question 8. Put the letter for the best answer or a ? in this box …………………………....☐

What does the underscore _ represent in SML pattern matching?

    A. A placeholder for unused or ignored values

    B. A variable that stores the entire input

    C. A way to match only empty lists

    D. A specific keyword for functions with no input

Question 9. Put the letter for the best answer or a ? in this box …………………………....☐

Which of the following lists will match the pattern x :: y :: z :: [], and what will the bindings be?

    A. [1, 2] – x = 1, y = 2, z = 0

    B. [1, 2, 3] – x = 1, y = 2, z = 3

    C. [1, 2, 3, 4] – x = 1, y = 2, z = 3

    D. [] – x = 0, y = 0, z = 0

Question 10. Put the letter for the best answer or a ? in this box …………………………....☐

Which of the following lists will match the pattern [42, _, x, y], and what will the bindings be?

    A. [42, 1, 2] – x = 2, y = 0

    B. [42, 1, 2, 3] – x = 2, y = 3

    C. [42, 1, 2, 3, 4] – x = 3, y = 4

    D. [1, 2, 3, 4] – x = 3, y = 4