Programming I (Python)
Assignment 1

1. Which of the following are true about Lisp programming language:

    1. Strictly typed
    2. Statically typed
    3. Dynamically typed
    4. Safe

Solution: **Grading Scheme:**

1. Strictly typed
2. Dynamically typed
3. Safe

2. Which of the following are true about OCaml commands:

    1. They are pure commands.
    2. They always produce a value.
    3. They may produce a value.
    4. They do not produce a value.

Solution: **Grading Scheme:**

1. They are pure commands.
2. They always produce a value.

3. Which of the following are true about OCaml programs:

1. OCaml programs must always be written on the top loop.
2. OCaml programs must be written in a file like in C.
3. OCaml programs must always be compiled explicitly before being executed.
4. OCaml compiler always produces native machine code as output as in C.
5. OCaml compiler always produces bytecode as output as in Java.
6. OCaml compiler can be used to produce either machine code or byte code as per user preference.

Solution: **Grading Scheme:**

1. OCaml compiler can be used to produce either machine code or byte code as per user preference.

4. The name of the OCaml debugger is:

1. ogdb
2. odebug
3. ocamldebug
4. ocamlgdb

Solution: **Grading Scheme:**

1. ocamldebug

5. Which are possible ways of executing an OCaml program:

1. Write on the OCaml toplevel.
2. Write in a file and run with ocaml command.
3. Write in a file, compile with ocamlc command and run the executable.
4. Write in a file, compile with ocamlopt command and run the executable.
5. Write in a file, compile with ocamlcom command and run the executable.

Solution: **Grading Scheme:**

1. Write on the OCaml toplevel.
2. Write in a file and run with ocaml command.
3. Write in a file, compile with ocamlc command and run the executable.
4. Write in a file, compile with ocamlopt command and run the executable.

6. When we use one of the OCaml compilers to compile an OCaml program program.ml, the compiler name and object code file name are related as follows:

    1. ocamlc $\mapsto$ program.mlo
    2. ocamlopt $\mapsto$ program.mlo
    3. ocamlc $\mapsto$ program.mlc
    4. ocamlc $\mapsto$ program.cmo
    5. ocamlc $\mapsto$ program.cmx
    6. ocamlopt $\mapsto$ program.cmo
    7. ocamlopt $\mapsto$ program.cmx

    Solution: **Grading Scheme:**

    1. ocamlc $\mapsto$ program.cmo
    2. ocamlopt $\mapsto$ program.cmx

7. Which of the following are native types in OCaml?

    1. int
    2. float
    3. char
    4. string
    5. list
    6. tuple
    7. dictionary
    8. record
    9. class
    10. modules

    Solution: **Grading Scheme:**

    1. int
    2. float
    3. char
    4. string
    5. list
    6. tuple

8. Which of the below are true about OCaml type system?

    1. Statically typed
    2. Dynamically typed
    3. Implicitly typed
    4. Explicitly typed
    5. Both implicitly and explicitly typed

Solution: **Grading Scheme:**

1. Statically typed
2. Both implicitly and explicitly typed

9. What are the features of a first class object in a programming language?

    1. Can be called as a procedure
    2. Can be passed as a parameter to a function
    3. Can be used as a type
    4. Can be returned from a function as a value
    5. Can be stored in a data-structure
    6. Can be imported as a module

Solution: **Grading Scheme:**

1. Can be passed as a parameter to a function
2. Can be returned from a function as a value
3. Can be stored in a data-structure

10. A working definition of a "safe" programming language is:

    1. A program written in the programming language can't ever fail.
    2. A valid program will never fault because of an invalid machine operation.
    3. There are no runtime type errors.
    4. Type conversions are disallowed.

Solution: **Grading Scheme:**

1. A valid program will never fault because of an invalid machine operation.
2. There are no runtime type errors.

11. Which of the following statements is true about OCaml expressions:
    1. OCaml expressions can't have side-effects.
    2. OCaml expressions evaluate to a single value.
    3. Every expression has exactly one type.
    4. The type of the expression depends of the values evaluated so far.

Solution: **Grading Scheme:**

1. OCaml expressions evaluate to a single value.
2. Every expression has exactly one type.

12. In OCaml, When an expression is evaluated, which of following things may happen:
    1. It may evaluate to a value of the same type as the expression.
    2. If typechecked successfully, it will never raise an exception.
    3. It may not terminate.
    4. It is guaranteed to terminate.

Solution: **Grading Scheme:**

1. It may evaluate to a value of the same type as the expression.
2. It may not terminate.

13. of the following will typecheck:
    1. 1 +. 2
    2. 1 + 2
    3. 1. +. 2.
    4. 1.0 + 2.0
    5. 1.0 +. 2.0

6. 1. +. 2

Solution: **Grading Scheme:**

1. 1 + 2
2. 1. +. 2.
3. 1.0 +. 2.0

14. Which of the following are valid variable names in OCaml:

1. abc
2. ab_c
3. Abc
4. Ab_c
5. ab−c
6. ab1

Solution: **Grading Scheme:**

1. abc
2. ab_c
3. ab1

15. Which of the following operators have left associativity:

1. +
2. <>
3. !=
4. ~−.
5. mod
6. lsr
7. lnot

Solution: **Grading Scheme:**

1. +
2. <>
3. !=
4. mod
5. lnot