Berner Fachhochschule

Introduction to Computer Science

Exercise 4

Programming Terms

1. Explain the meaning of the following terms.

Term	Explanation
Algorithm	An algorithm is a finite sequence of well-defined, computer-implementable instructions, typically to solve a class of problems or to perform a computation. Algorithms are always unambiguous and are used as specifications for performing calculations, data processing, automated reasoning, and other tasks.
Assembler	The only encoding that a digital processor understands is binary codes. The machine language is therefore stored and processed in the form of binary numbers. To simplify the programming of computers, the idea soon arose to write the commands in a text format that was more readable for humans. The translation into the machine code was done by a program - the assembler.
Assignment	An assignment assigns a value to a variable. The statement y = 17 stores the value 17 in the variable y. For the statement x = y, the value of the variable y must first be determined before it can be assigned to the variable x.
Compiler	A compiler is a program that translates source code written in a high-level programming language into to a lower level programming language to create an executable program. An interpreter is a software that first transforms the source code and then executes the indicated operations.
Data Type	A data type is an attribute which tells the compiler or interpreter how the programmer intends to use the data. Most programming languages define some basic data types. Most programming languages allow to define additional data types, by combining multiple elements of existing types and defining the operations of the new data type
Floating point number	A floating-point number consists of a number of significand digits and an exponent that says where the decimal (or binary) point is placed relative to the beginning of the significand digits. Negative exponents represent numbers that are very small (i.e. close to zero).
Integer	The integer data type represents some range of mathematical integers (whole numbers). Two example integers are -32 or 105. Integral data types are usually represented as a group of (binary) digits.

Interpreter	An interpreter is a program that executes a sequence of statements. The interpreter reads one or more source files, analyzes them, and then executes statement on instruction by translating them into machine code. interpreters are significantly slower than compilers but generally provide better error analysis.
Operator	Operators are constructs or signs defined within programming languages. They behave like functions, but they differ syntactically or semantically. Common simple examples are arithmetic (e.g. addition), comparison (e.g. "greater than"), or logical operations (and / or / not). More involved examples include assignment or field access. Programming languages usually define a set of built-in operators.
Programming language	A programming language is a formal language with a set of instructions that produce various kinds of calculations or output. Programming languages are used to implement algorithms. Most programming languages consist of instructions, statements or rules.
Syntax	The syntax of a formal language like a programming language refers to a system of rules according to which well-formed or *syntactically* correct expressions, formulas, or program texts are formed from a basic list of numbers, operations and characters.
String	A string data type is a sequence of characters. A string is a data type and is usually implemented as an array of bytes (or words) that stores a sequence of characters, using some character encoding like ASCII or UTF-8.
Statement	A statement is a syntactic unit of an imperative programming language (i.e. a command) that directs the computer to perform a specific action. A program is a sequence of one or more statements or instructions written in a high-level language.
Variable	A variable is an abstract container for a value that occurs during a computational process. Normally, a variable in the source code is identified by a name and has an address in the memory of a machine, a type which defines the interpretation of the variable content, and a value of this type.
While Loop	Loops are a way to repeat the same code multiple times. The statements in the body of a while loop are repeated as long as a given condition is true. One single execution of the body is called an iteration.

2. What is the output of the following code?

```
x = 4
y = 10
z = 12

if x < y and y > z:
    print(1)
if x > y or y < z:
    print(2)
if not x > y or not y > z:
    print(3)
if x < z and not y < z:
    print(4)
```

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```
2
3
```