

## VCAA Software Development 2020 Sample Exam - Suggested Solutions to Part B

### Question 1

1. name
2. staffname
3. salary

XML elements are fields (name, staffname, salary)

<staffid="1001"> is not valid XML.

<staff id="1001"> would be valid, then the end tag would be </staff>

### Question 2

```
FOR EACH Employee IN EmployeeFile
  IF EmployeeStatus = current THEN
    IF EmployeeNumber < LowestEmployeeNumber THEN
      LowestEmployeeNumber ← EmployeeNumber
    END IF
  END IF
END FOR EACH
PRINT LowestEmployeeNumber
```

Pseudocode is designed to be read by humans. You should practice writing pseudocode for selection sort and quicksort algorithms. For VCE, there are some conventions you should know:

- ← is the assignment operator. If you want to set a variable called numDays to the value 5, you would write: numDays ← 5
  - In VCE pseudocode the equals sign is only used as an equivalence operator to test if something is equal (like the double equals == is used in PHP).
  - Write key words in uppercase or bold (or both)
  - Use indenting (marks are awarded for this in the exam!)
  - Use INPUT and OUTPUT or READ and PRINT for data that is input and output
  - Use BEGIN and END for your functions and procedures (or FUNCTION... END FUNCTION)
  - Make sure functions RETURN something
  - Don't comment every line because the code should be readable
- Other syntax
- LOOP... END LOOP
  - REPEAT... UNTIL
  - WHILE... DO... END WHILE
  - IF (THEN)... ELSE IF (THEN)... ELSE... END IF
  - FOR... TO... END FOR
  - AND, OR, NOT, TRUE, FALSE

### Question 3

**Array:** data structure that stores a list of values of the same data type. Traditionally in Computer Science, Arrays contain just one data type.

**Record:** used to store a collection of related data of different data types. Records have a set number of fields and these are named.

This is not true of languages such as PHP, Ruby and Javascript that have mixed data types for arrays. Python uses a data type called lists that can hold different types.

#### Question 4

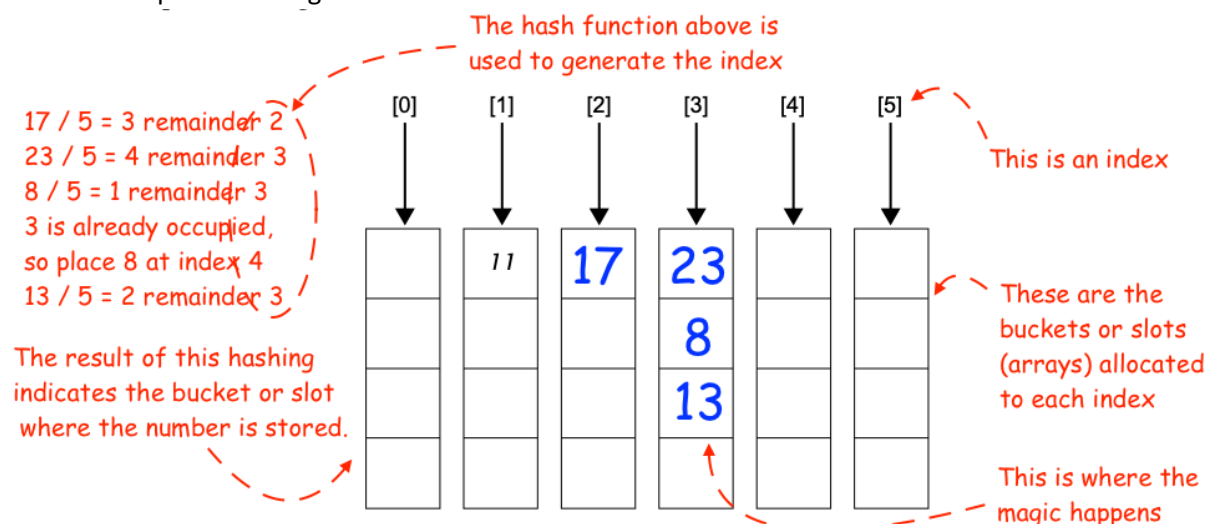
Description	Processing feature
returns a value after performing an action	function
defines the appearance and behaviour of an object	class
instructions that perform an action associated with an object	method

- Function: a named group of reusable code that performs a specific task and returns a value. A function is not defined inside a class.
- Class: a template or blueprint to create objects.
- Method: a named group of reusable code that is associated with a class and that defines the behaviour of an object. A method is defined inside a class..

Note: some programming languages make a distinction between functions, which return a value, and routines/procedures which do not return a value.

#### Question 5

a. Complete the diagram below



b. Outline how a value is retrieved using a hash key

Apply the hash function to the hash key to find the index for the value and move directly to the bucket or slot at that index to retrieve it.

An index is used to save time when looking up information by organising items in slots so that a hash function can be used to quickly find and retrieve them.

A hash table is a particular type of associative array which, instead of (key, value) pairs, uses (key, bucket) pairs, where the bucket (or slot) is a one dimensional array.

For example, if you are storing daily maximum temperatures, the data you have is the date (28/10/2020) and the corresponding maximum temperature (22).

You use a hash function to create a hash key from the data value. e.g. 3, and store the maximum temperature in the slot with that index.

When you want to retrieve the maximum temperature for 28/10/2020, you apply the hash function again to find out the index where the value was stored.