

Revision Sheet

A-Level Computer Science · Unit 20 Further Programming

10 vocabulary items · 25 marks of exam questions (4 questions)

Part 1 · Vocabulary review (10 items). The terms this unit is examined on most. Mark it yourself from the answer key.

Section A · Chinese to English

Write the English word.

1.

[1]
2.

[1]
3.

[1]
4.

[1]
5.

[1]
6.

[1]
7.

[1]
8.

[1]
9.

[1]
10.

[1]

Part 2 · Exam questions (25 marks, 4 questions) begins on the next page. They are ordered easy to difficult and none of them has been set before.

11 Draw **one** line from each programming paradigm to its **most appropriate** description.

Programming paradigm

Description

Declarative

Imperative

Low-level

Object-oriented

Programs using the instruction set of a processor

Programs based on events such as user actions or sensor outputs

Programs using the concepts of class, inheritance, encapsulation and polymorphism

Programs with an explicit sequence of commands that update the program state, with or without procedure calls

Programs that specify the desired result rather than how to get to it

[4]

12 The pseudocode algorithm shown copies an active accounts text file `ActiveFile.txt` to an archive accounts text file `ArchiveFile.txt`, one line at a time. Any blank lines found in the active accounts text file are replaced with the words "Account not present" in the archive accounts text file.

Complete this file-handling pseudocode.

```
DECLARE Account : STRING

.....

OPENFILE "ArchiveFile.txt" FOR WRITE

WHILE NOT .....
    READFILE "ActiveFile.txt", Account
    IF Account = "" THEN

        WRITEFILE "ArchiveFile.txt", "....."
    ELSE

        WRITEFILE "ArchiveFile.txt", .....
    ENDIF
ENDWHILE

.....

CLOSEFILE "ArchiveFile.txt"
```

[5]

13 A declarative language is used to represent the following facts about a school.

```
01 teaches(alan, mathematics).
02 teaches(ioana, geography).
03 teaches(nina, history).
04 teaches(alan, statistics).
05
06 studies(ahmed, history).
07 studies(freya, history).
08 studies(kim, history).
09 studies(freya, geography).
10 studies(hua, mathematics).
11 studies(hua, statistics).
12 studies(hua, geography).
13
14 tutors(alan, kim).
15 tutors(alan, hua).
16 tutors(alan, freya).
17 tutors(nina, ahmed).
```

These clauses have the following meaning:

Clause	Meaning
01	Alan teaches mathematics.
06	Ahmed studies history.
14	Alan is Kim's tutor.

(a) More facts are to be included. Sam studies history and Nina is his tutor.

Write the additional clauses to record these facts.

```
18 .....
19 ..... [2]
```

(b) Using the variable `Student`, the goal:

```
studies(Student, history)

returns

Student = freya, ahmed, kim
```

Write the result returned by the goal:

```
studies(Student, geography)

Student = ..... [1]
```

- (c) Write the goal, using the variable x , to find all the students who have a tutor that teaches them. For example, Hua has Alan for a tutor and is also taught mathematics by Alan.

.....
.....
.....
..... [4]

- 14 Data types can be defined using pseudocode.

The data type, `BuildingRecord`, is defined in pseudocode as:

```
TYPE BuildingRecord
  DECLARE BuildingID : INTEGER
  DECLARE BuildingGroup : STRING
  DECLARE OwnerName : STRING
  DECLARE BuildingAddress : STRING
  DECLARE DateLastSold : DATE
  DECLARE PriceLastSold : REAL
ENDTYPE
```

A variable, `BuildingRegister`, is declared in pseudocode as:

```
DECLARE BuildingRegister : BuildingRecord
```

- (a) Write **pseudocode** statements to assign:

- 1067 to the `BuildingID` of `BuildingRegister`
- house to the `BuildingGroup` of `BuildingRegister`

.....
.....
.....
..... [2]

- (b) The type definition for `BuildingRecord` is changed. The data type for `BuildingGroup` is changed to an enumerated type, `BuildingType`, with values of house, bungalow, apartment and farm.

- (i) Write the type declaration for `BuildingType` in **pseudocode**.

.....
.....
.....
..... [2]

- (ii) Write the new declaration for `BuildingGroup` in **pseudocode**.

.....
..... [1]

- (iii) Write the new **pseudocode** statement to assign house to `BuildingGroup` of `BuildingRegister`.

.....
..... [1]

(c) The program is to be rewritten using Object-Oriented Programming (OOP). The data type `BuildingRecord` is to be changed to a class, `BuildingClass`.

The properties for `BuildingClass` are `BuildingID`, `BuildingGroup`, `OwnerName`, `BuildingAddress`, `DateLastSold` and `PriceLastSold`.

All the properties are set to `PRIVATE`, for example:

```
PRIVATE PriceLastSold : REAL
```

(i) Write the declaration in **pseudocode** for `OwnerName` as `PRIVATE`.

.....
..... [1]

(ii) Explain why the properties have been set to `PRIVATE`.

.....
.....
.....
..... [2]