

Cambridge International AS & A Level

COMPUTER SCIENCE

9608/42

Paper 4 Further Problem-solving and Programming Skills

May/June 2020

PRE-RELEASE MATERIAL

Solved PRE-RELEASE MATERIAL 9608/42 MJ-2020

TASK 1 – Declarative programming

A knowledge base contains information about students in a class and who their friends are. A declarative programming language is used to query the knowledge base.

Some clauses in the knowledge base are shown.

```
01 person(william).
02 person(edith).
03 person(gabrielle).
04 person(raj).
05 person(sasha).
06 person(andrei).
07 friend(william, raj).
08 friend(raj, gabrielle).
```

Key focus: Declarative programming

| Clause | Explanation |
|--------|----------------------------|
| 01 | William is a person |
| 07 | William is a friend of Raj |

TASK 1.1

Two new students are joining the class. They need to be added to the knowledge base.

Write the clauses to add two new people to the knowledge base.

ANSWER

```
09 person(saim).
10 person(harris).
```

TASK 1.2

Sasha makes friends with one of the new students.

Add a clause that states Sasha is a friend of one of the new students.

ANSWER

```
11 friend(sasha, saim).
```

TASK 1.3

A new type of clause `notfriend()` is added to the knowledge base.

Add a clause that states Andrei is not a friend of Gabrielle.

ANSWER

```
12 notfriend(andrei, gabrielle).
```

TASK 1.4

Explain why the following two clauses would be needed in the knowledge base:

```
friend(william, raj).
```

```
friend(raj, william).
```

ANSWER

Statement `friend(william, raj)` says William is a friend of Raj. If William is friend of Raj, it implies that Raj is also friend of William, but in declarative programming language, you have to add it to knowledge base so other statement must be added `friend(raj, william)`.

TASK 1.5

Write a query to find all the friends of a person.

ANSWER

```
13 friend(raj, ThisPerson).
```

```
Friend =    William  
          Gabrielle
```

This Query will show all the friends of Raj