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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/22**

Paper 2 Problem-solving and Programming **February/March 2018**

PRE-RELEASE MATERIAL

No Additional Materials are required.

This material should be given to the relevant teachers and candidates as soon as it has been received at the Centre.

READ THESE INSTRUCTIONS FIRST

Candidates should use this material in preparation for the examination. Candidates should attempt the practical programming tasks using their chosen high-level, procedural programming language.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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In preparation for the examination candidates should attempt the following practical tasks by **writing and testing a program or programs**.

Students in a school are allowed to choose extra subjects each year. Students provide the school administrator with their names and their subject choices. Places in subject groups are allocated on a 'first come, first served' basis. There are two classes of 30 students and they can each choose **two** extra subjects from:

- Physics
- Chemistry
- History
- Geography
- Computer Science

The maximum group size for each subject choice is 20 students and the minimum group size is 10 students. If more than 20 students choose a subject then that subject can be split into two groups. Each subject can have no more than two groups. If less than 10 students choose a subject then it is not available that year. A program is required to show a summary of the number of students who have chosen each subject, identify subject group sizes, produce subject group lists and identify problems.

Write and test a program or programs for the school administrator.

- Your program or programs must include appropriate prompts for the entry of data.
- Error messages and other output need to be set out clearly and understandably.
- All variables, constants and other identifiers must have meaningful names.

You will need to complete these **three** tasks. Each task must be fully tested.

TASK 1 – Data entry and number of students who have chosen each subject.

The school administrator enters the data for each student. Write a program for TASK 1 to store this data then calculate and output the number of students who have chosen each subject.

TASK 2 – Output subject group lists and identify problems.

Using your results from TASK 1, allocate students to subject groups. Print out list(s) of student names for each viable subject group. Identify any subjects that are over or undersubscribed, identify the students who have been allocated to one subject group only and those who have not been allocated to any group. Print out this information.

TASK 3 – Identify spare places in subject groups.

Using your results from TASK 2, print out the number of spare places for each subject. Any group that has fewer than 20 students has spare places. Calculate the total number of spare places and the total number of unallocated student choices. Show whether the number of spare places available is enough to cover the unallocated choices.

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