International GCSE Computer Science (9210) — Paper 1 Programming

Advaspire Mock Examination 1 — Preliminary Material

To be issued to candidates before the examination, with the electronic Skeleton Program.

Instructions

- This Preliminary Material describes the Skeleton Program, *Treasure Island*.
- You should study the Skeleton Program, run it and become familiar with how it works before the examination.
- In the examination you will be asked questions about the Skeleton Program, and you will be asked to make changes to it.
- You must not take this copy of the Preliminary Material into the examination. A clean copy will be given to you.

The game

Treasure Island is a one-player digging game played on a square island of **8 × 8** squares.

At the start of a game, **5 treasures** and **3 rocks** are hidden at random squares of the island. The rocks can be seen, but the treasure cannot.

The player has **20 digs**. On each turn the player types the **grid reference** of a square to dig, for example `C5`. A grid reference is a column letter (`A` to `H`) followed by a row number (`1` to `8`). Row 1 is at the top of the island.

When the player digs a square, one of four things happens:

What is on the square	Message displayed	What happens to the square
Treasure	`You found treasure!`	It is shown as `$` from now on
Sand	`Nothing here. Treasure nearby: n`	It is shown as a hole, `o`
Rock	`You hit a rock`	Nothing changes
A hole or treasure already dug	`You have already dug there`	Nothing changes

`n` is the number of hidden treasures in the (up to) eight squares that touch the square that was dug, including diagonally.

Every dig uses up one of the player's digs, even when the player hits a rock or digs a square that has already been dug.

The game ends when the player has found all of the treasure or has no digs left. The player scores **10 points** for each treasure found.

The island display

The island is displayed like this. Hidden treasure is shown as sand.

```
   A B C D E F G H
1  o ~ ~ ~ ~ ~ ~ ~
2  ~ $ ~ ~ ~ ~ # ~
3  ~ ~ ~ ~ ~ ~ ~ ~
4  ~ ~ # ~ ~ ~ ~ ~
5  ~ ~ ~ ~ ~ ~ ~ ~
6  ~ ~ ~ ~ ~ ~ ~ ~
7  ~ ~ ~ ~ ~ # ~ ~
8  ~ ~ ~ ~ ~ ~ ~ ~
```

Symbol	Meaning
`~`	Sand that has not been dug (this may hide treasure)
`o`	A hole that has been dug, with nothing in it
`$`	Treasure that has been found
`#`	A rock

The menu

```
TREASURE ISLAND
1. Play a new game
2. Play the practice island
Q. Quit
```

- **Option 1** hides the treasure and rocks at random squares.
- **Option 2** loads the **practice island**. It always hides the treasure and rocks in the same squares, so that a program can be tested with the same results every time. You will be asked to use the practice island when you test your changes in the examination.

How the island is stored

The island is stored as a two-dimensional list. `island[row][column]` holds one symbol. Row index `0` is row 1 on the display and column index `0` is column A, so grid reference `C5` is `island[4][2]`.

Hidden treasure is stored with the symbol `T`, which is never displayed.

Programming languages

The Skeleton Program is provided in **Python 3**.

Suggested preparation

You may find it useful to:

- run the program several times, playing both a random game and the practice island
- work out what every subroutine does and which subroutines call which
- find every constant, and notice where each one is used
- find every example of definite and indefinite iteration, selection, and a subroutine that returns a value
- try out small changes to the program — for example, changing the number of digs or adding a new message — and then put the original program back.