AQA

AS
COMPUTER SCIENCE

Paper 1

[redacted]

Preliminary Material

To be opened and issued to candidates [redacted] subject to the instructions given in the Teachers' Notes (7516/1/TN).

Note

- The **Preliminary Material**, **Skeleton Program** and **Data File** are to be seen b candidates and their teachers **only**, for use during preparation for the examination [redacted]
  It **cannot** be used by anyone else for any other purpose, other than that stated in the instructions issued, until after the examination date has passed. It must **not** be provided to third parties.

Information

- A Skeleton Program is provided separately by your teacher and must be read in conjunction with this Preliminary Material.
- You are advised to familiarise yourselves with the Preliminary Material and Skeleton Program before the examination.
- A copy of this Preliminary Material and the Skeleton Program will be made available to you in hard copy and electronically at the start of the examination.
- You must **not** take any copy of the Preliminary Material, Skeleton Program and Data File or any other material into the examination room.

INSTRUCTIONS FOR CANDIDATES

The question paper is divided into **three** sections and a recommendation is given to candidates as to how long to spend on each section.

Below are the recommended timings for the 2017 examination.

Section A
You are advised to spend no more than **20 minutes** on this section.
You will be asked to create a new program and answer questions **not** related to the **Preliminary Material** or **Skeleton Program**.

Section B
You are advised to spend no more than **20 minutes** on this section.
Questions will refer to the **Preliminary Material** and the **Skeleton Program**, but will not require programming.

Section C
You are advised to spend no more than **65 minutes** on this section.
Questions will use the **Preliminary Material** and the **Skeleton Program** and may require the **TestCase.txt Data File**.

Electronic Answer Document

Answers for **all** questions, for **all** sections, must be entered into the word-processed document made available to you at the start of the examination and referred to in the question paper rubrics as the **Electronic Answer Document**.

Preparation for the Examination

You should ensure that you are familiar with this **Preliminary Material** and the **Skeleton Program** for your programming language.

PLANT GROWING SIMULATION

The **Skeleton Program** accompanying this **Preliminary Material** is a program for the simulation of plants growing.

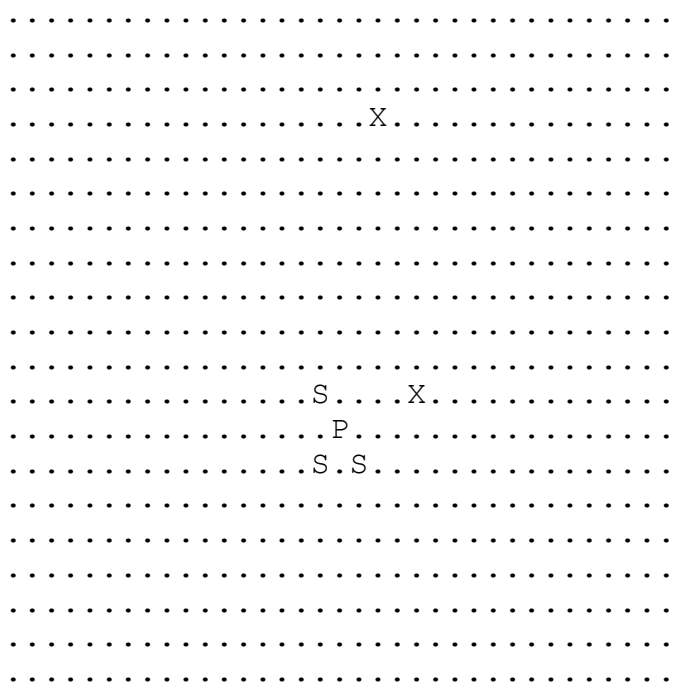
A plant scientist wants to use a computer to simulate how a specific plant will propagate over several years.

The field in which the plant is to grow and propagate is represented as a rectangular grid of cells. A cell can contain just soil, a plant, a seed or rock. It will always contain only one of these.

- If a cell contains just soil, then the cell is represented by `'.'`
- If a cell has a plant growing in it, the cell is represented by `'P'`
- If a cell contains a seed, then the cell is represented by `'S'`
- If a cell contains rock, then the cell is represented by `'X'`

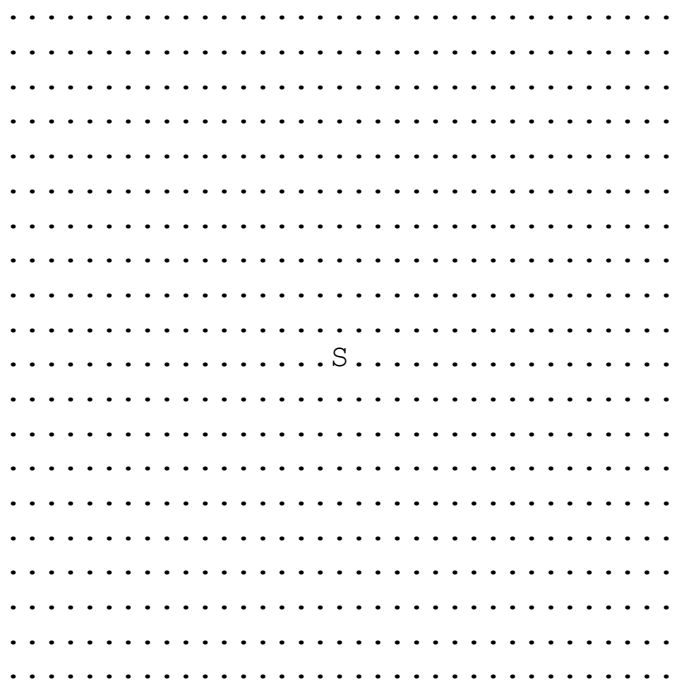
Figure 1 is an example of a field model.

Figure 1



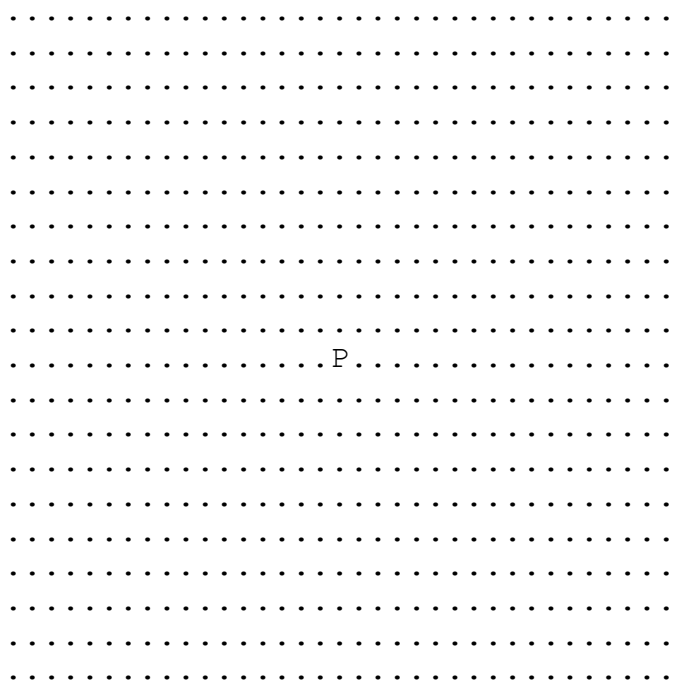
A new field starts with a seed in the middle of the field as shown in **Figure 2**.

Figure 2



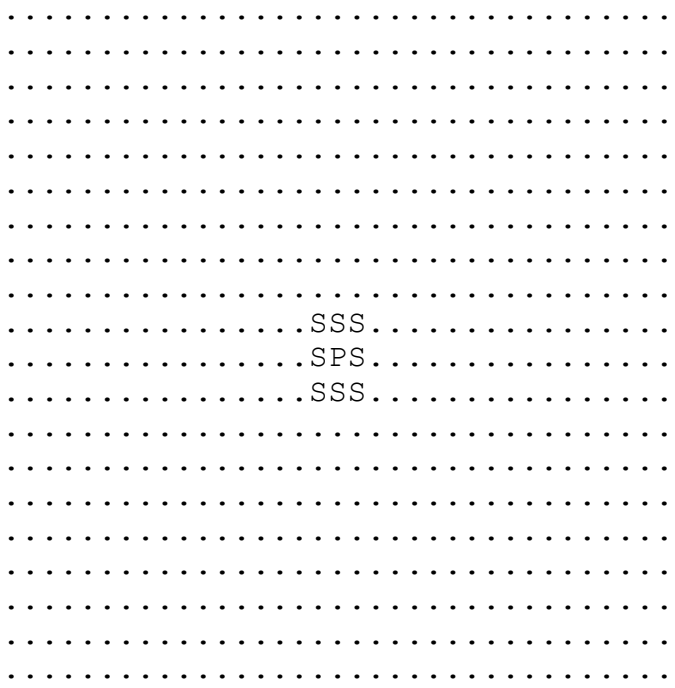
In the spring the seed germinates into a plant as shown in **Figure 3**.

Figure 3



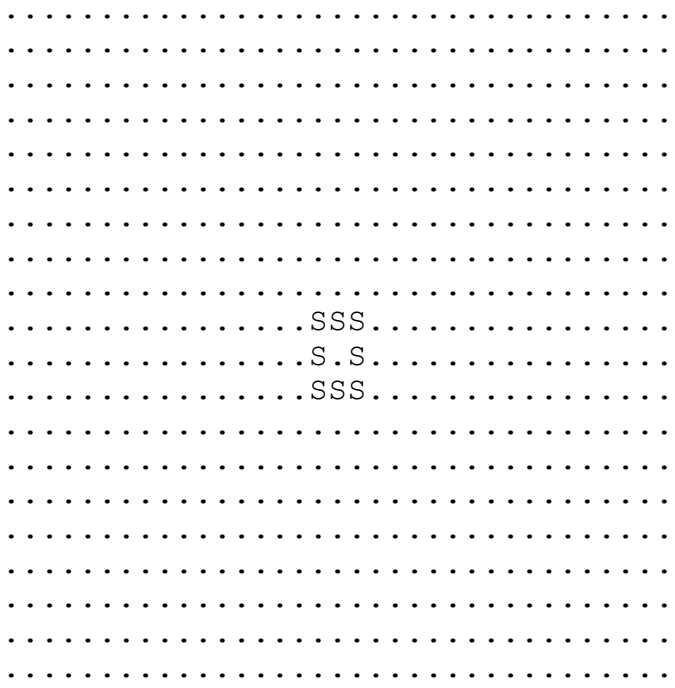
In the autumn the plant drops a seed in each cell immediately around the plant as shown in **Figure 4**.

Figure 4



In the winter the plant dies. This is represented by the cell content changing to a `'.'` as shown in **Figure 5**.

Figure 5

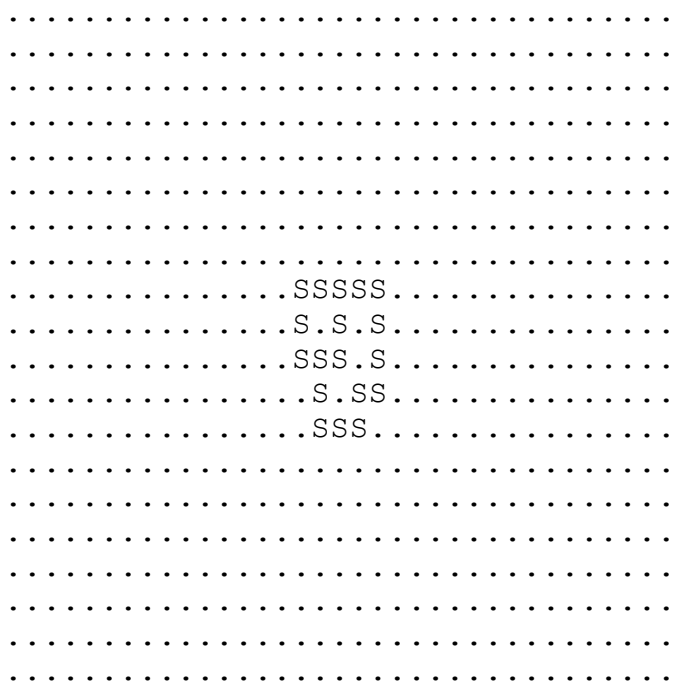


The seeds then lie dormant until spring when the cycle starts again and each seed germinates into a plant. In the spring a random frost may occur and kill off some of the plants. In the summer random rainfall patterns can result in a severe drought which also kills off some of the plants. In the autumn plants drop their seeds.

- If more than one seed lands in (drops into) a cell, only one seed survives.
- If there is a plant where a seed lands, the seed does not survive. The plant remains in the cell.
- If there is rock where a seed lands the seed does not survive. The rock remains in the cell.

At the end of year 2 the field contents may be as shown in **Figure 6**.

Figure 6



The **Skeleton Program** can use the **TestCase.txt Data File** to start the simulation with a different setup.

Figure 7 shows the contents of **TestCase.txt**.

Figure 7

```
......S.............................|  0
....................X.............|  1
....................................|  2
.........SSSSSSXSSSSSSSSSS...S.....|  3
....................................|  4
.........S.S...........S.S.........|  5
.........S.............S.........|  6
.........S.SSSSSSSSSSXSS.S.........|  7
.........S.S...........S.S.........|  8
..X.................................|  9
.........S.S.S.......S.S.S.........| 10
.........S.X.S.SSSSS.S.S.S.........| 11
.........S.S.S.S...S.S.S.S...X.....| 12
.........S.S.S.S.S.S.S.S.S.........| 13
.........S.S.S.S...S.S.S.S.........| 14
.........S.....SSSSS.....S.........| 15
.........S.S.S.......S.S.S.........| 16
..........XX........S..............| 17
.........S.S...........S.S.........| 18
.........S.............S.........| 19
```

The **Skeleton Program** allows the user to simulate plant growth and propagation for up to five years. There is also an option to step through the simulation a year at a time.

END OF PRELIMINARY MATERIAL

There is no Preliminary Material printed on this page

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