



Ant Simulation

PAPER 1 EXAM RESOURCE PACK 2026

for A Level AQA Computer Science

C# EDITION

- DIGITAL RESOURCE -

This pack includes paper versions of the electronic files.

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Printouts of electronic resources (for reference)

- Code Breakdown (16 pages)
- Grid Example (1 page)
- Theory Questions: Non-write-on Version (2 pages)
- Theory Questions: Write-on Version (5 pages)
- Coding Tasks (23 pages)
- Additional Tasks (Extension) (2 pages)
- Theory Questions: Mark Scheme (4 pages)*
- Coding Tasks: Mark Scheme (75 pages)*
- Electronic Answer Document (EAD) (3 pages)
- UML Class Diagram: Complete (1 page)*
- UML Class Diagram: Activity (1 page)**

** The electronic PDF versions of these files are password-protected, so that students can only access them with your permission. Passwords can be found in the Teacher's Introduction on page iv.*

*** Note there are also electronic copies of the UML Diagrams ('Complete' & 'Activity' versions) provided.*

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It is the teacher’s responsibility to decide how to use this resource to assist themselves and their students appropriately. You may simply wish to read this material to better inform yourself and to help you prepare your lessons and to give you ideas for your teaching. You may also consider whether it is appropriate to hand out some of the sheets for reference and to use some of the activities for classwork or homework. You may also consider whether it is appropriate to hand out the booklet to be worked through by your students more independently.

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The resources here are provided as an interpretation of the pre-release material.

The author does not have any special knowledge of what to expect on any particular exam.

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Teacher's Introduction

The resource pack consists of the following sections:

- **Code breakdown:** a detailed technical overview of the Skeleton Program, describing in detail each class and method in turn – including their purpose/function, parameters and return values. Note that this is intended as a helpful reference document only, and not as a substitute for exploring the code in a practical manner. There is also a 'Grid Example' file which can be used as a printout to help students to understand the simulation.
- **UML class diagram activity:** requires you to study the program and fill in the gaps with the missing class/method names, data types, associations and access levels.
- **Video:** a quick overview of the **Ant Simulation** application mechanics – intended as a visual aid to accompany the notes in the official AQA pre-release material.
- **Theory questions:** designed to test your understanding of the Skeleton Program. These questions require access to the program, but no modifications need to be made to the program. Write-on (with answer lines) and non-write-on versions are available.
- **Coding tasks:** there are 24 modification tasks to test your programming skills – as well as an additional 15 modification ideas that you may also want to try as extension tasks.
- **Solutions / Mark schemes:** included for UML class diagram activity, theory questions, and coding tasks.

This resource is intended to supplement your teaching only. **Please read full disclaimer (p. iii) before using it.**

DIGITAL RESOURCE

Once you have downloaded the files for this resource via (zzed.uk/ProductSupport) you will have access to the following:

- 📁 AntSimulation this folder contains all of the content (PDF/DOCX) accessible via a HTML interface
- 📄 Passwords.txt for teacher use – this file contains all of the passwords for the protected PDFs (also listed below)

* PRINTED COPIES OF ALL THE MATERIALS IN THIS DIGITAL RESOURCE PACK ARE INCLUDED FOR REFERENCE.

Installation: Extract the files from the downloaded ZIP file and move the entire TargetClear folder onto a network location that is accessible for students, and provide them with a shortcut to the index.html file. All content can be accessed from this page.

Passwords: All of the PDFs accessible via the *Solutions* web page are password-protected, so that students can only access them with your permission. Each password is a four-digit code, as follows:

📄 c02a-UML-Diagram-Complete.pdf	2875
📄 c06-TheoryQuestions-MS.pdf	4761
📄 c07-CodingTasks-MS.pdf	3954

Should you wish to give students access to ALL protected-PDFs, the master password for all files is: **zz2ghc4**

This pack is based on Version 2 of the Ant Simulation code released by AQA on 21/11/25.

Please ensure you are using Version 2 of the code from Centre Services.

Ant Simulation

Ant Simulation represents a small world of ants showing their interaction with nests, food and pheromone trails.

The user can experiment with four different simulations, each representing different configurations of the small world. The world is represented by either a 5×5 or 10×10 grid. Simulations 1–3 contain a single ant nest, and simulation 4 contains two ant nests. At the start of the simulation, each nest contains a single queen ant and multiple worker ants (configured by parameters when the application starts up).

The application uses the concept of stages to advance, each stage essentially being a snapshot of the current state of the simulation world. As the user advances the stages, the entities within the simulation world, be those ants, pheromones or the nests themselves, all advance one stage at a time, each performing one of their preset operations. Examples of these operations are move, pick up food, follow a pheromone trail, or deposit food at the nest.

Initially, worker ants move at random around the simulation world, moving to one of their neighbouring cells per stage. If an ant finds a cell containing food, the ant picks up a small amount of that food, and then as the stages are advanced by the user, makes its way directly back to the nest. As it moves back towards the nest, the worker ant lays down a pheromone trail. If other worker ants are near to that pheromone trail, they will follow it to the food source to also collect food and take it back to the nest. This represents how ants behave in the real world.

The application also represents the relationship between food available at a nest and ant population. At each stage, if the food in a nest gets too low, or the population gets too high for the food available, some of the ants belonging to the nest are culled.

When the nest has plentiful food levels, however, the queen ant will give birth to new worker ants and even on a very small chance, another queen.

During operation, the user can display the simulation world in its entirety, view part of it, or even view an individual cell within the world to see it in detail.

The objective of the application is to experiment with different configurations of the simulation world, advancing the simulation stage by stage to see how the ants interact with each other, the food around them, and the nest.

This resource aims to help you get to grips with and prepare for the A Level Paper 1 examination for summer 2026, which is partly based on the **Ant Simulation** pre-release material.