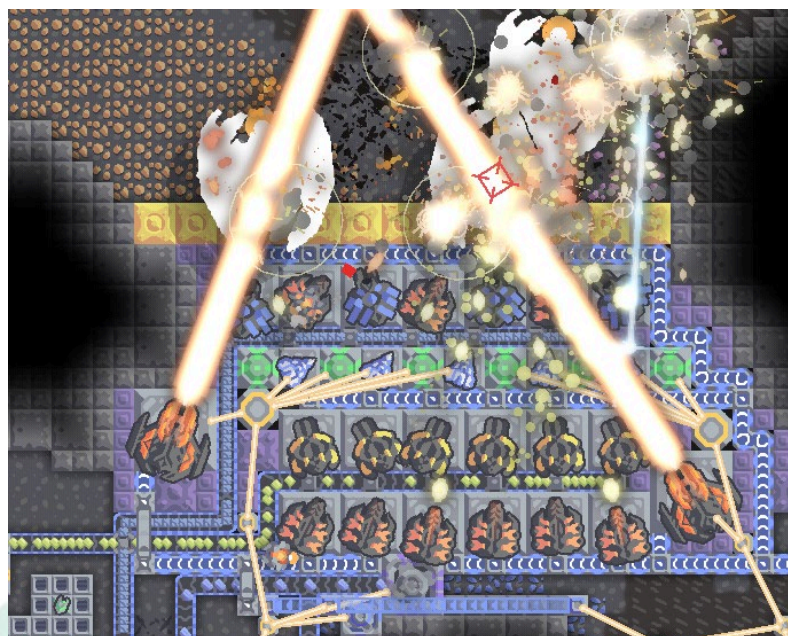


Collaborate to build the best automated defense

Previous compulsory steps / Prior students' knowledge	None
Learning objectives	Practicing 'what should I do?' thinking, planning, organization within a team.
Subjects	Programming
Recommended age	All
Material needed	Smartphones or PCs, a common Wi-Fi connection
Sequence duration	1 hour
Individual or group activity	Group activity
Skills developed	Collaboration & teamwork, communication, creativity, problem solving, planning
Price range of the game	1€ or free for iOS/Android, 5€ on PC and consoles, cross-platform
Similar games to use with the approach of the sequence	Factorio, Satisfactory, Astroneer

Step by step: how to implement the sequence



Screenshot 1 : Mindustry. Source: itch.io

Mindustry is a mix of tower-defence and automation/construction games. Tower-defence games revolve around waves of enemies of increasing strength that attack the player's base. The player needs to defend their base by constructing walls and towers. Automation and construction games are games where the player starts with a minimal base and must mine resources, research technology and build an automated industry to expand.

In Mindustry, players must build conveyor belts to convey resources to their defence technologies and plan their next action while keeping in mind the approaching enemy wave.

The game has a non-linear approach to levels. There are many things you can do, and only you choose what to do next. This will make your students practice the “what

should I do now” type of thinking. In cooperative multiplayer sessions, this question also fosters communication, planning and teamwork skills. Moreover, all this happens under light pressure due to incoming attacks.

If students are lost for too long without knowing what to do, give them a bit of help. If you do not have time to play the game, you can use this video **for** your own preparation:

💡 [‘Mindustry Starter Guide REMASTERED’](#) by D.A.R.K.

It advises you on how to start and how to expand during a game.

The second question students should ask themselves is “what do I need to...”. Next, they should check the required resources, explore the map to find them and then design an infrastructure to extract them.

It might not be obvious what construction or tool is for, but it is also part of the experience: discovering by trial and error.

Requirements

PC versions require a very low configuration.

The game is cross-platform, which means that Android and iOS players can join PC games and vice-versa.

You can take advantage of this by starting a game, showing your students how it works and then having them join your session. All you need is a common Wi-Fi connection.

Use this guide for network connexions: <https://mindustrygame.github.io/wiki/faq/>

- **Step 1: Discovery (10 minutes)**

Play in front of your students and show them the basics of the game, then have them join your game by hosting an online session.

Otherwise, to practice their “what should I do?” thinking, ask them to complete the first level. Whenever they ask a question, ask the other students to answer. If no one knows, you can deliver the answer.

- **Step 2: Students play the game (30 minutes)**

Gather your students in groups, and each group plays on a different server. You can have up to 16 players at the same time. However, we recommend starting with small groups of 3 to 5. Then you can play with groups of 16 students and compare the organizational issues that arise between both group sizes.

When students are numerous among a team, organisation is going to be crucial. They are like a team of workers that need to plan their tasks before a deadline, which is the enemy attack in this case.

Provide minimum help about what to do, how to plan actions or how to use something. Help should come from within the team. Tell your students what strategies they could use to answer the question themselves. For instance, you could advise them to organise by tasking someone with experimenting with how one tool works, to think about what roles or tasks they could distribute in their team, etc.

You might want to allow students to consult online help sources, such as wikis etc. This can illustrate ways for getting information, i.e. doing research by themselves to make something work without depending on someone to help them, which is a required skill in many jobs.

Competition mode:

If you have more time, or if students acquired the basic mechanics of the game quickly, you could organize a small competition.

Create a game using the attack game mode and a more complicated level, then split your students into teams, with each team playing on a specific server. The team that finishes the level the fastest or that has destroyed more enemies in a given time period wins.

- **Step 3: Debrief and discussion (15 minutes)**

Ask your students if they have encountered any issues in terms of team communication. What happened? Try to break down with them what happened objectively, without pointing fingers. Then try to find solutions or points of improvement.

Explain and use the root cause method. You can use this article and video:

💡 [‘Root Cause Analysis’](#) by Mind Tools



References:

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