STUDENT HANDBOOK 2022

NETWORKS

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STUDENT HANDBOOK

Welcome to the STEM Video Game Challenge! We are very excited to have you take part.

The world of video games is an exciting and fun place to be, it is also creative, inspiring and educational! Yes, that's right you can learn lots of stuff playing and making games. The STEM Video Game Challenge is all about you showing us what you can do. So grab some friends and make a team of no more than four (4), find a mentor to help you and get your game on!

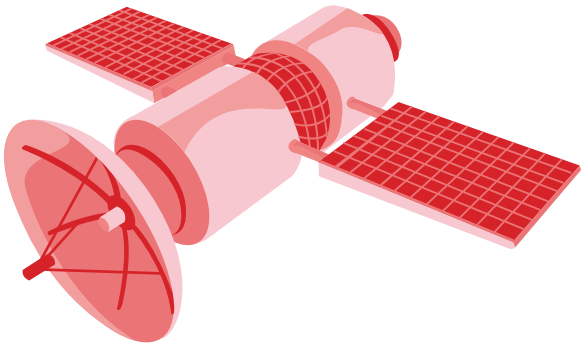
Finding a Mentor

Your Mentor has to be over the age of 18 and must have a Working with Children check for the State in which you live and will be working. They can be a Teacher, a Mum or a Dad or an older sibling a friend, an Uncle or Auntie even a Grandparent!

Their job is to:

- Register your team.
- Make sure you all have permission from your parents/guardians.
- Support you in making your game.
- Submit your game for judging.
- Be the communicator with us, the STEM VGC team.

A Mentor can look after more than one team.



GAME PLATFORM & CATEGORIES

Your age and the platform you choose to use to make your game will determine which category you can enter. All the platforms must be FREE or free for education. You can't use a platform you have to pay for. This is because we want it to be fair for everyone.

Game Categories

Students may enter in one of six (6) categories:

Year 5-8: Playable Game developed in Scratch

Year 5-8: Playable Game developed in GODOT

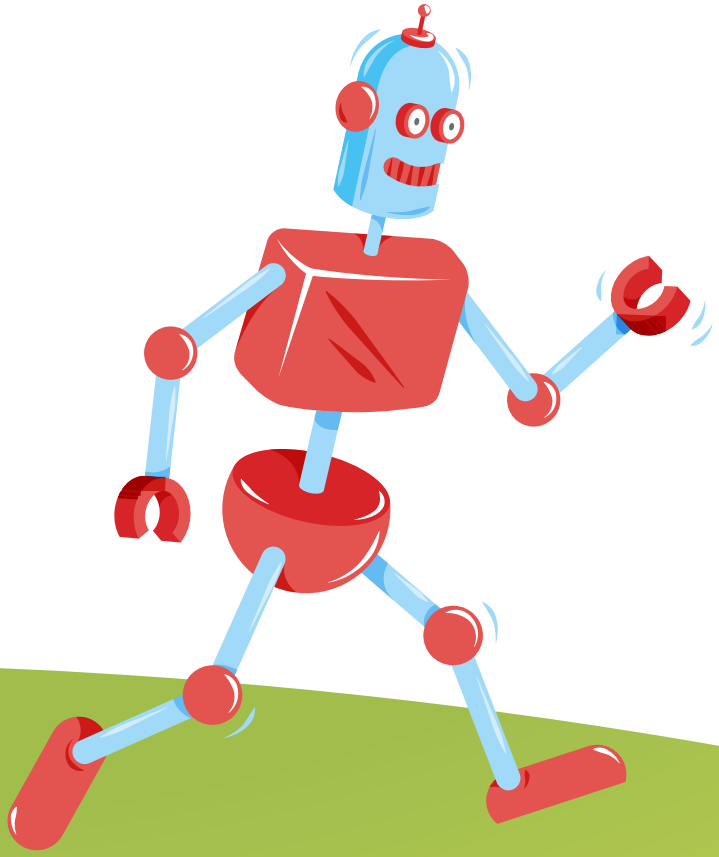
Year 5-8: Playable Game developed in any other free, or free for education, game development platform.

Year 9-12: Playable Game developed in GODOT

Year 9-12: Playable Game developed in Unity3D or Unreal Engine

Year 9-12: Playable Game developed in any other free, or free for education, game development platform.

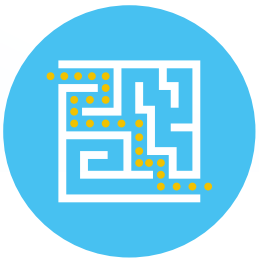
Once again if you need help deciding - talk to your Mentor about what platform is best for your team to use to make your game.



GETTING YOUR TEAM TOGETHER

How you organise your team is entirely up to you and your Mentor. What works for one team may not suit another. However, we recommend considering the assignment of roles within the team. This does not mean team members cannot have input into other aspects of the game, the assignment of responsibility simply ensures that all aspects of the game development process are being looked after by someone. Don't forget if you need to talk it through, your Mentor is there to help you work this out.

Some role suggestions are:



Game Designer

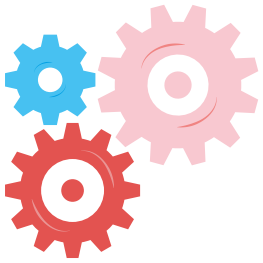
Game Designers help to determine the rules and the structure of the game making sure that players can easily understand how to play the game. They need to think about the gameplay, the goals of the game, the balance of challenges and rewards, feedback to the player, levels and increasing difficulties. Game Designers may need to be good communicators, helping to guide other members of the team.

Artist/Visual Designer

Artists and Visual Designers are responsible for the look and graphic design of the game, ensuring it is consistent throughout the game. Artists and Visual Designers are generally creative with an ability to visually represent concepts or ideas, and take responsibility for the overall graphic style and appeal of a game.

Programmer

Programmers make the game work! They write the code, scripts and mechanisms that make the game functional and playable. Programmers are responsible for functionality and many of the technical aspects of game development.



Storyteller

Storytellers contribute to the narrative that underpins the game. They are responsible for providing the game with environments, characters, motivation and context. Storytellers are driven by player engagement - they think about what is happening in the game, how the story will progress through the game, and how the progression will help to encourage/challenge the player to continue playing.

Sound & Musical Effects

Sound and music can heighten the game play and bring the world of the game to life. Music can bring an emotional element to the game, while sound can add a dynamic atmosphere. Original sound and music can make a good game great!

Tester

The Tester is responsible for testing the game and ensuring that there are no glitches or technical problems. Tester's play a valuable role in ensuring that games are functional, engaging and enjoyable. They provide insights on how the game feels to play, and the player experience.

(NB: It is recommended that you test your game with a person not connected to the build and design of the game – someone fresh will pick up problems that those who understand the game will not!)

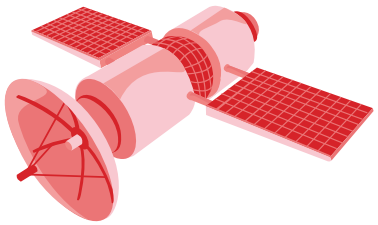
Remember: Team members work together and support each other! It is a common occurrence for roles to overlap and, in small teams, for members to perform more than one role. The key to working well as a team is communication and cooperation –working together to achieve a number of smaller goals that produce one fantastic game!

THEME

NETWORKS

> “We are now all connected by the internet, like neurons in a giant brain.”
>
> **Stephen Hawking**

What is a network?



A network is a group of things connected in some way.

The connected things could be physical, like train stations or computers or neurons in a brain, or they might be ideas or feelings or other things that are not physical. The connections between these things that help to form the network could also be physical like pipes or roads or wires, or they too might be non-physical.

So we can organise networks into two main types: *physical and non-physical*.

Physical networks are the actual connections between real world objects:

- a tree contains a network of branches and roots
- an integrated circuit contains a network of connected semiconductors
- a town or city contains interconnected roads between particular destinations.

Non-physical networks are made of connections between ideas and other non-physical things.

Mathematical networks connect mathematical ideas – for example, the edges of a cube are connections between the corners of the cube. If the cube is real—like dice—the connections can be physical. But the dice you might have been imagining when you read the last sentence are not real and their edges are a non-physical network.

What type of network would a social network that connects people be? The people themselves are physical things, but what are the actual connections? What connects you to your friends and family? Is it physical?

The connections in networks can be laid out in different ways. We sometimes call the layout of a network its topology. There are a few different types of network topology:

- line
- bus
- mesh
- ring
- star
- tree

Figure 1 shows examples of a computer ring and a mesh topology. What are the differences between the ring and mesh topologies? Why do you think they were named?

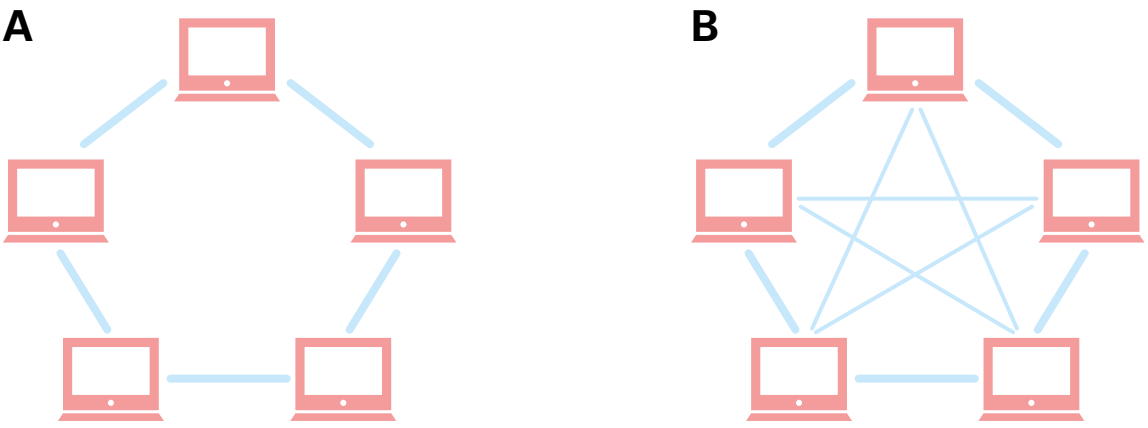


Figure 1: (A) a ring topology network and (B) a mesh topology network.

What do you think the other layouts might actually look like if they were drawn? Can you think of any other topologies?

Networks in games

So, with the STEM video game challenge in 2022, your challenge is to build a game that involves a network in some way.

There are different ways that networks could be incorporated into a game:

Network world

The network could form the 'world' of the game. Many games are based in a world of some kind: the background in which the world is set.

The game world could be detailed and complex, like *Fortnite* or *Breath of the Wild*. The world could be based on something in the real world, like *FIFA* or *NBA 2K*. Or the world could be something simple, like the 64 squares of a chess board.

In a *network world* game, the world is a network. Players might have to navigate around the network to complete the goal, or goals, of the game.

Network goal

Maybe the network is part of the world of the game, or not, but either way is the goal itself of the game. The game might involve building or extending or destroying a network in some way.

There are lots of games like this, including *Train Conductor World* and *Mini Metro*. What sort of network could you build in your game?

Connections in a network

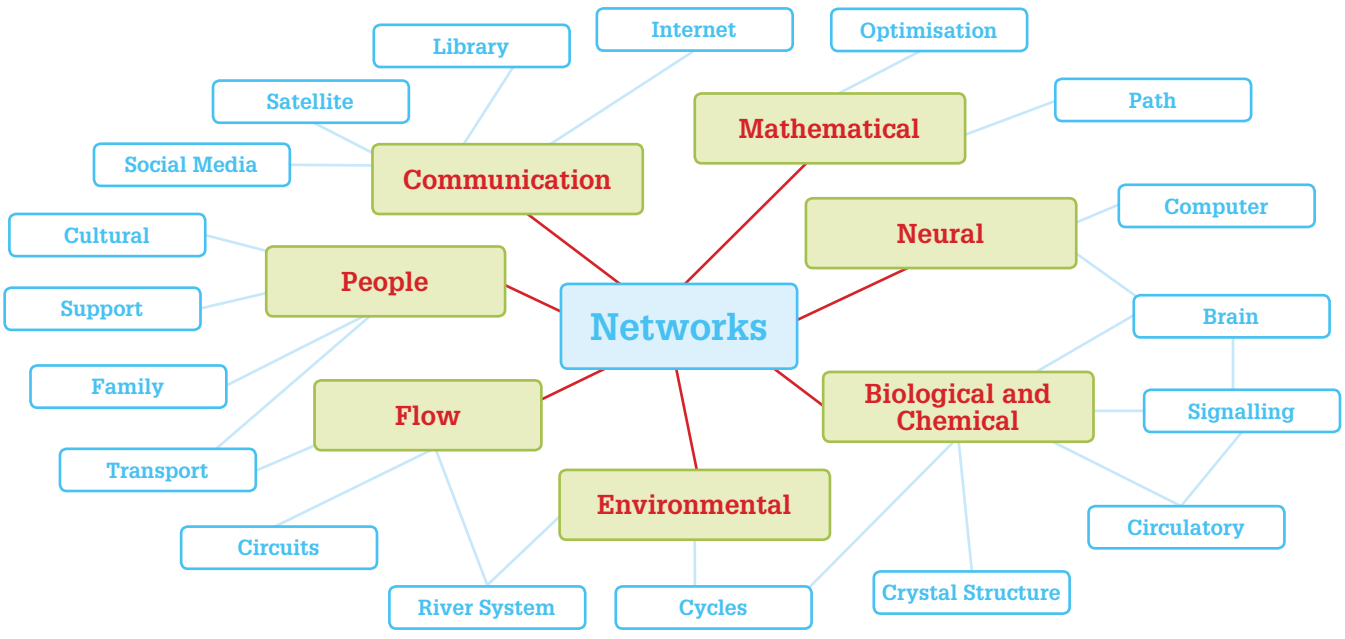
Maybe it's the actual connections within the network that are the key part of a game. The goal of the game is related to the connections that do or don't exist, or the connections that can be built between the things in the network. *Flow Free* is an example of a game that focuses on the connections.

Of course, these are only ideas to get you started. We would love you to be really creative and think beyond what is described here.

Some starting points to think about networks and your game

The network theme is only a starting point for your imagination to run wild.

But if you are stuck, you might consider some of these different sorts of networks and the ways that they might be incorporated into a game.



GAME DESIGN DOCUMENT (GDD)

As part of your entry your team will need to submit a Game Design Document (GDD). A GDD is a planning tool used by game development professionals to identify and map out the key elements of a game before it goes into production. Don't underestimate the power of the GDD!

The best game ever created could be entered, but if it doesn't have a good GDD it will not win!

Don't leave this until the end! We can tell when teams forget about the GDD and do it after they have finished building their game!

The judges will look at the GDD as they play your game. They want to see what went wrong, what went right and how your team moved through the development process:

- How did you resolve a coding problem?
- Why does a character look the way it does?
- Why does a character action sound like that?
- What did you set out to achieve?
- How did it change over time?

A good GDD will answer questions just like these and show the judges how you made your game.

It's useful to think of it as a planning tool:

- What is the game about? (narrative/story)
- Who it is intended for? (audience)
- How it will work? (gameplay mechanics)
- What the requirements are? (technical considerations)
- How it will look? (artwork/graphics)
- How long it will take to make? (timeline)
- What tools or resources do you need to make it? (capability)

Use the GDD to plan, plan, plan… a successful game will always have a mountain of planning and thinking before the first piece of code is even written.

Rules

Yes, we have rules. This is a competition after all!

Your Mentor has a big list of rules and you must not break any of them. We are not going to make you read all of them, but there are some you must be aware of:

1. You must be enrolled in year 5 - 12 in a school located in Australia or are home-schooled in Australia.
2. Only the registered team members guided by their Mentor are allowed to work on the game.
3. You are NOT allowed to alter your game or GDD in anyway after they are submitted for judging. (Yes, we do check! You will be disqualified if we find alterations to the code after submission.)
4. You must give your signed permission slip from your parent/guardian, to your Mentor to look after for the duration of the competition.
5. You can't be in more than one team. You can only be part of one team and enter one game per year.
6. There will be no more than four (4) prizes available in any game category.
7. While your game will always belong to you, by entering you give us (ACER and the STEM Video Game Challenge office) permission to use it, and show it to people especially if you win for twelve (12) months after submission.

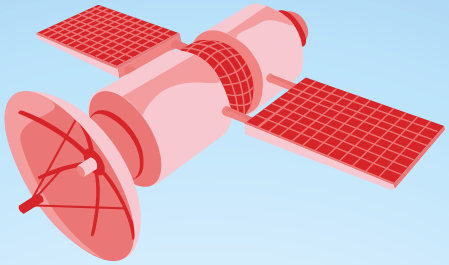
Prizes & Awards

OK, we know this bit is important to you all. The prizes change each year depending on our sponsors. So while we can't tell you what you are going to win, if PAX is running as a live event you will definitely get a pass to PAX for each team member, and passes for each team member to bring along a guardian if under the age of 18. Other than that it'll just have to be a surprise!

If your team wins you will be asked to travel to PAX in Melbourne for the awards ceremony, if you can't that's OK we will sort out something with your school. At the awards ceremony you will get your prize and have lots of photos taken. Your game and GDD will be on display for people to look at and play. We may also have a panel discussion about gaming and education that you will have to attend – other than that you are free to enjoy three (3) days of fun and gaming magic at PAX.

If you have any questions ask your Mentor, if they aren't sure then we are here to help. Get your Mentor to email us with any questions **contact@stemgames.org.au**

GOOD LUCK!



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