



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

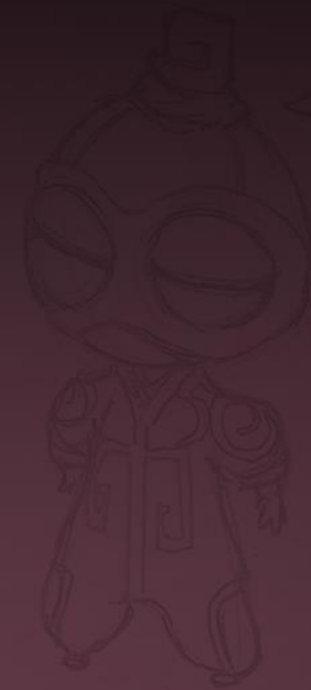
BA COMPUTER GAMES DESIGN

GAME THEORY & DESIGN

Production Bottlenecks



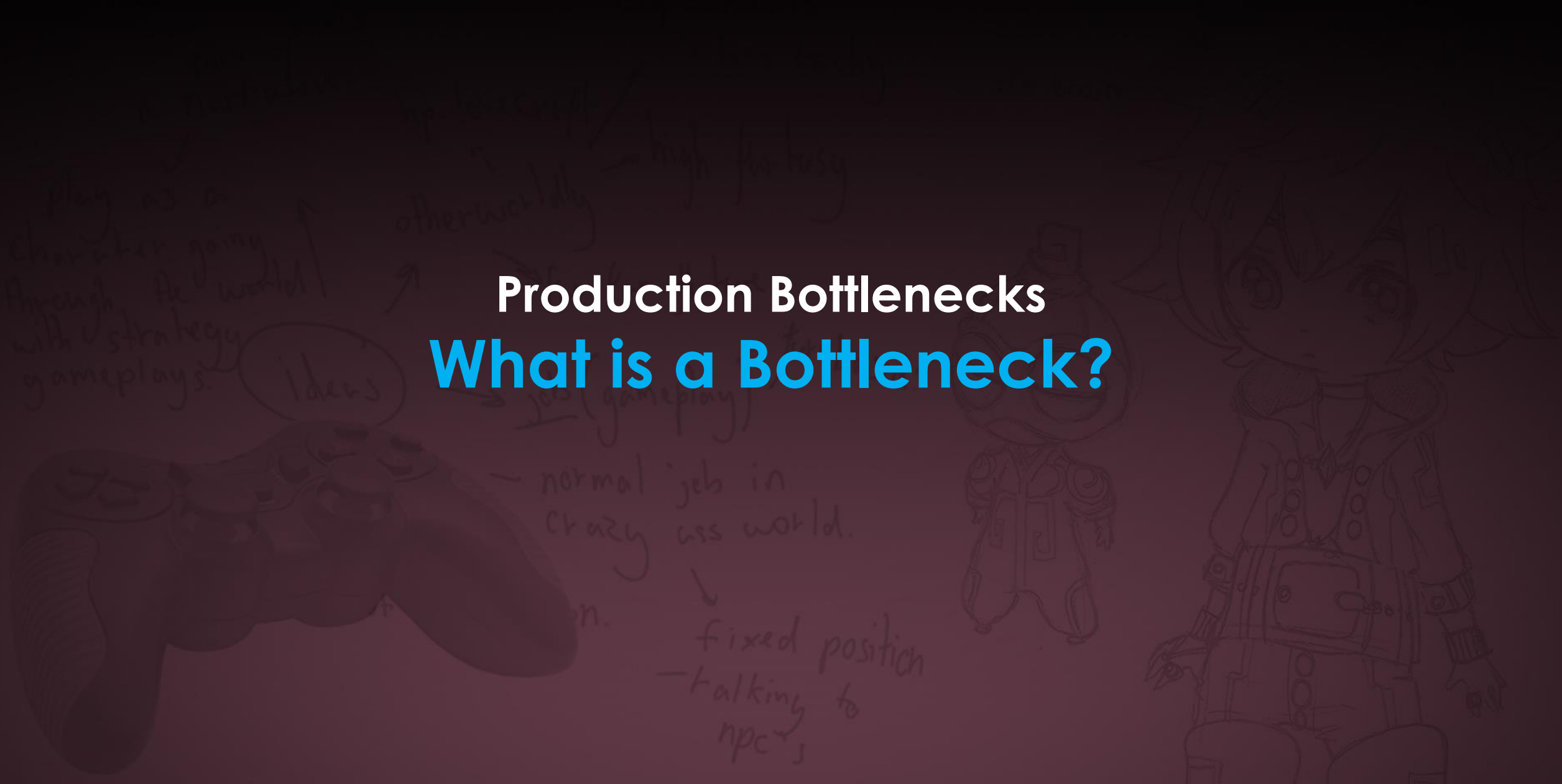
- What is a Bottleneck?
- How to identify bottlenecks
- Flow Charts
- The 'Five Whys' technique
- How to unblock bottlenecks
- Summary
- Practical: Bottleneck Exercise





Production Bottlenecks

What is a Bottleneck?





A bottleneck in a process occurs when **input comes in faster than the next step can use it to create output.**





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Bottlenecks in production can result in loss of time and money – and can have a severe impact on project planning and adhering to tight schedules and rigid deadlines.





Production Bottlenecks

How to Identify Bottlenecks



normal job in
crazy ass world.

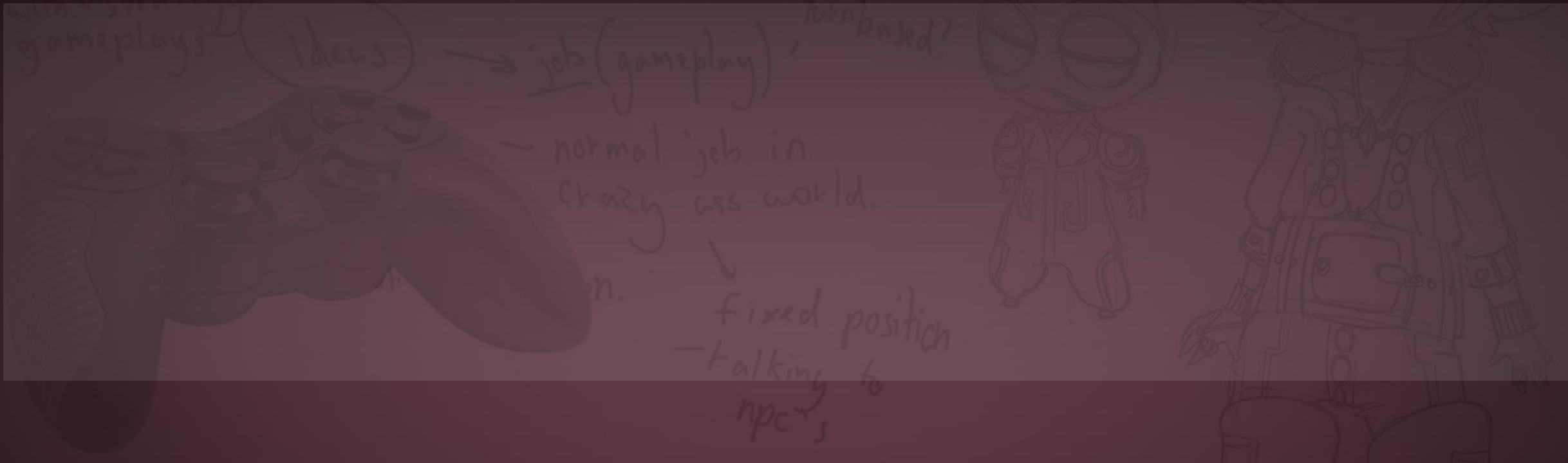
fixed position
- talking to
npc's





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Some other signs of bottlenecks include:





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- **Long wait times** – Work being delayed because team members are waiting for a concept, asset or more research/information.



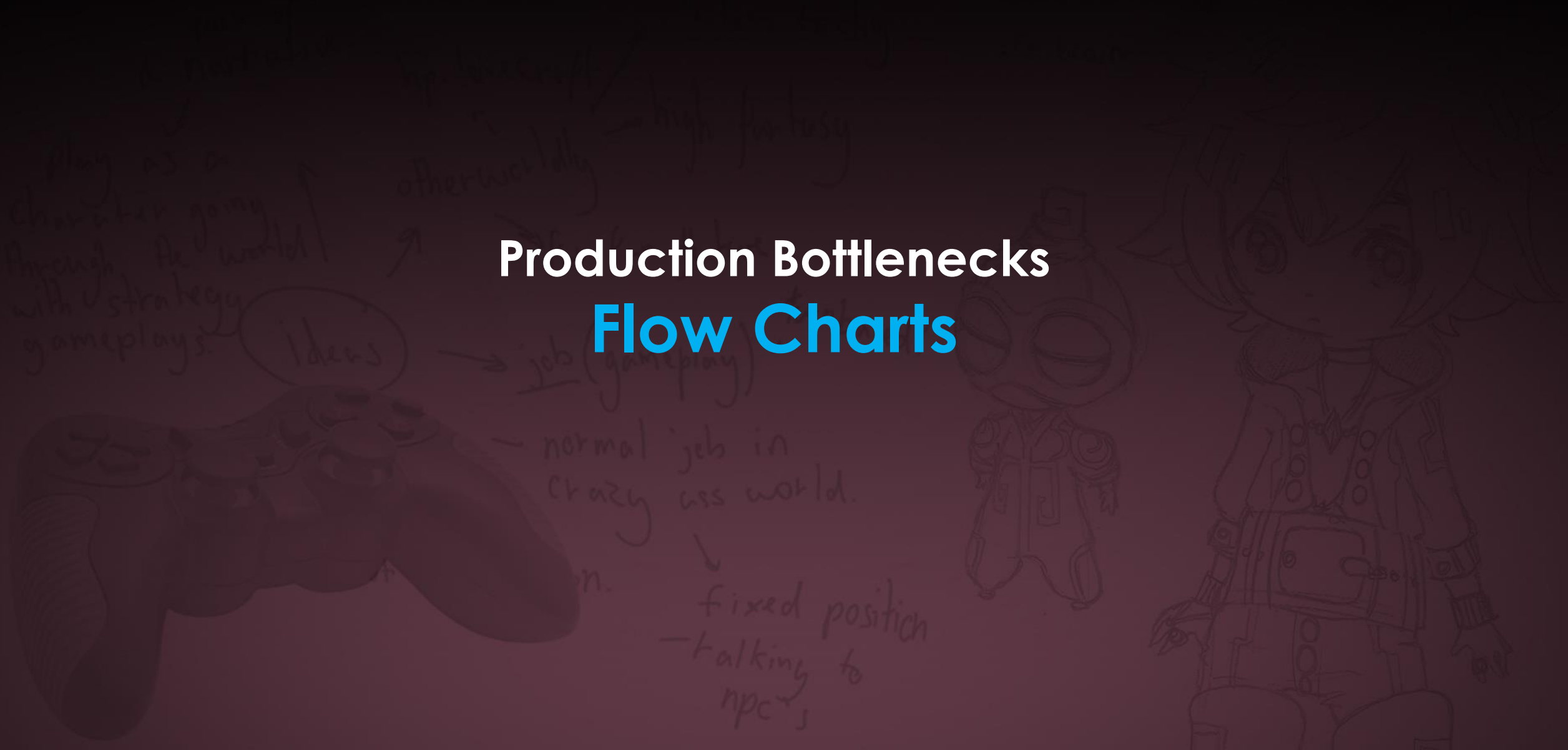
Routines or situations that regularly cause stress or frustration in your day can actually be a significant indicator that a bottleneck exists somewhere.

Some other signs of bottlenecks include:

- **Long wait times** – Work being delayed because team members are waiting for a concept, asset or more research/information.
- **Backlogged work** – There's too much work piled up at one end, and not enough at the other end.



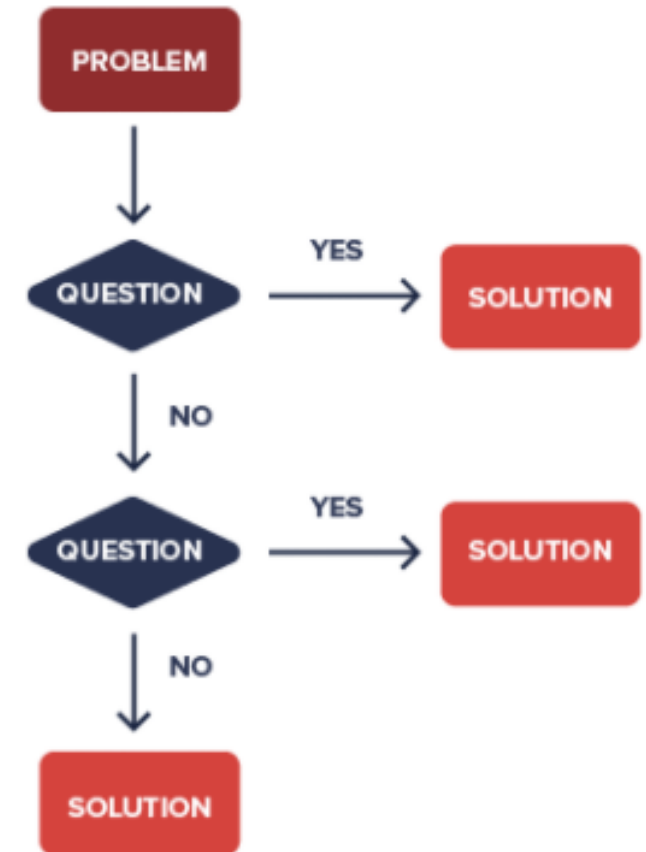
Production Bottlenecks Flow Charts





The use of a **flow chart** can help identify where bottlenecks are occurring.

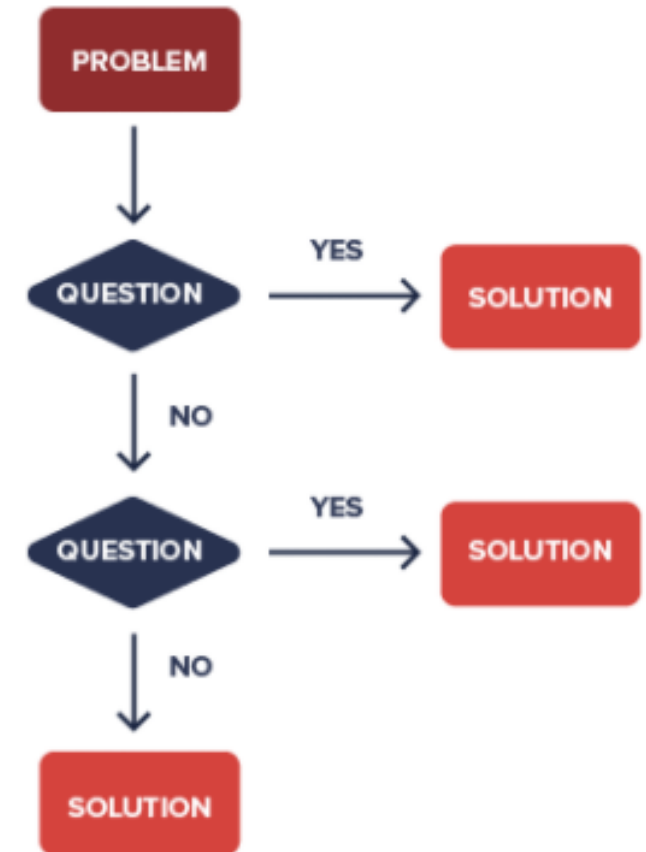
Flow charts break down a system by detailing every step in the process in an easy-to-follow diagrammatic flow.

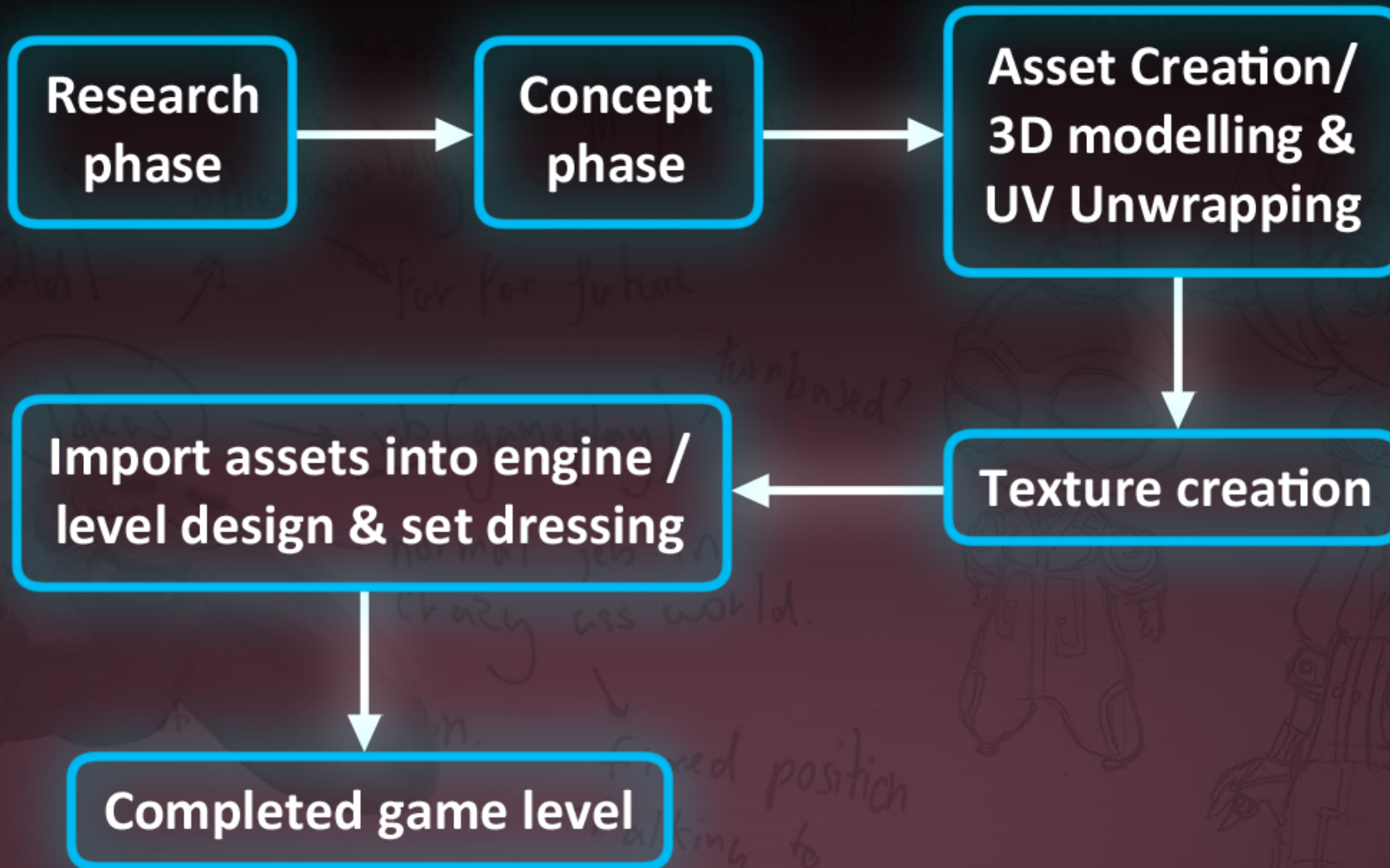


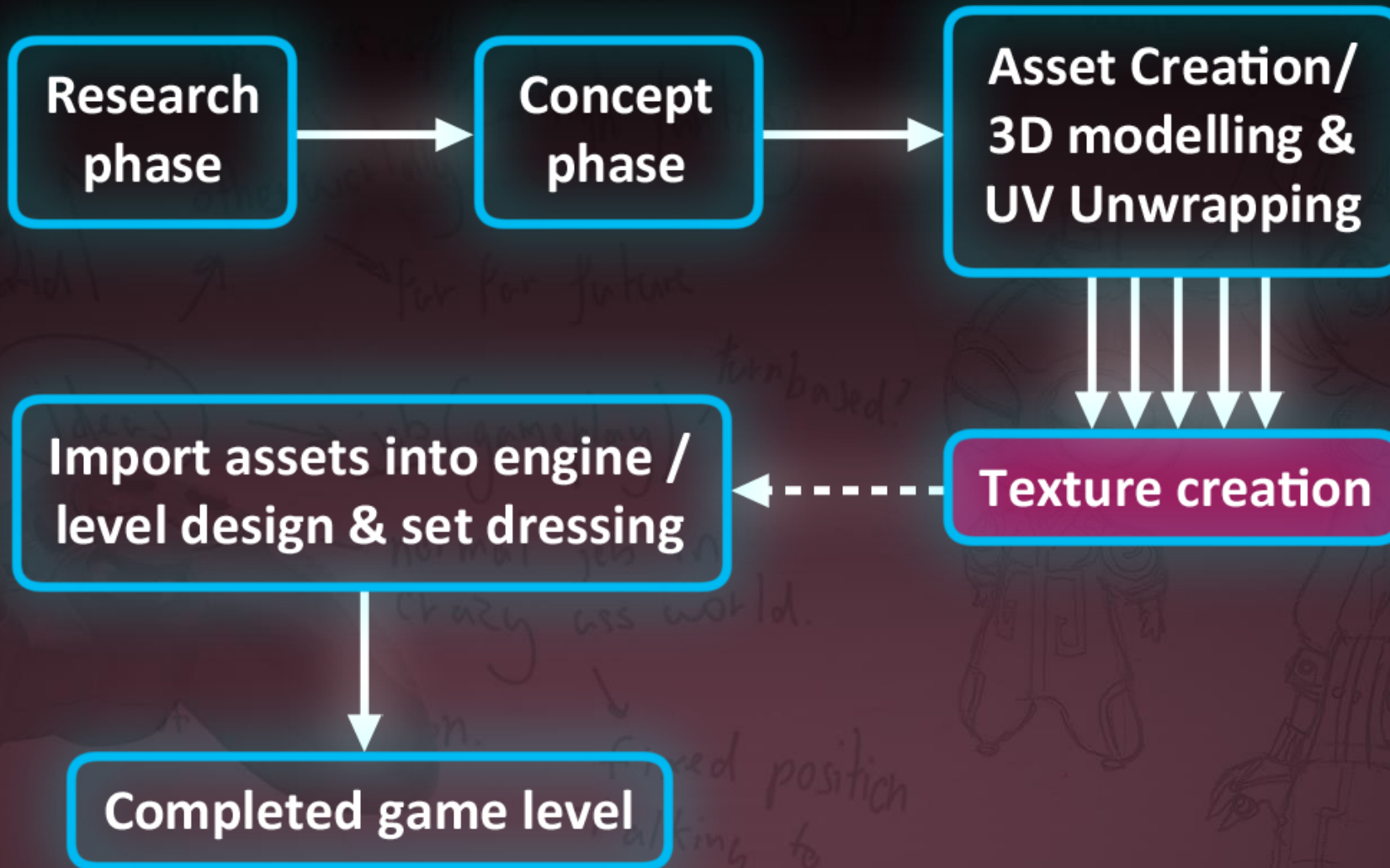


Once a process has been mapped out, **it's much easier to see where there might be a problem.**

The production team should meet and identify each step that your project needs to function well.



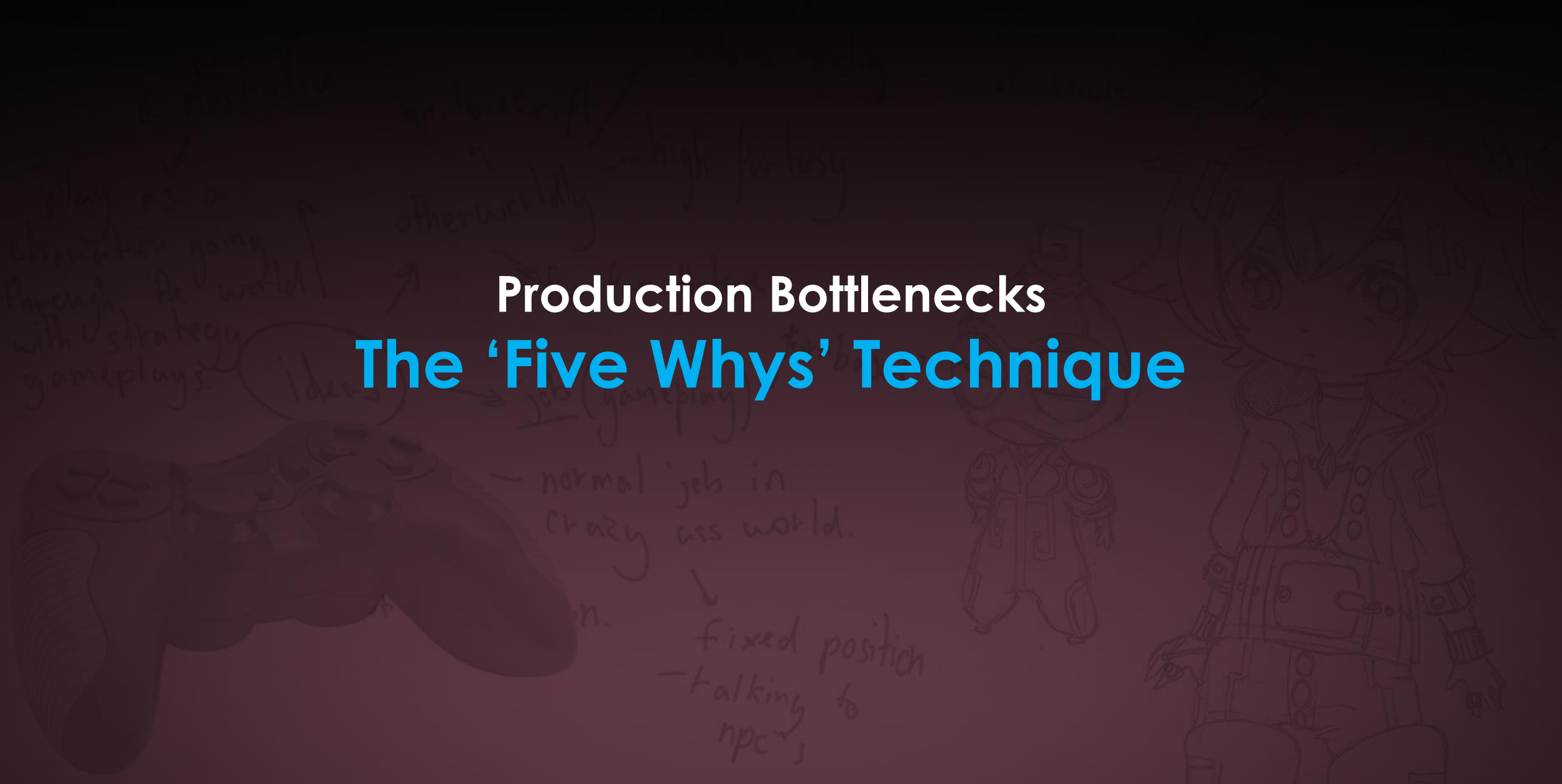






Production Bottlenecks

The 'Five Whys' Technique





The **'Five Whys' Technique** can also help the team identify how to unblock a bottleneck.

To start, identify the problem you want to address.

Then, working backward, ask yourself why this problem is occurring. Keep asking yourself "Why?" at each step, until you reach the root cause.



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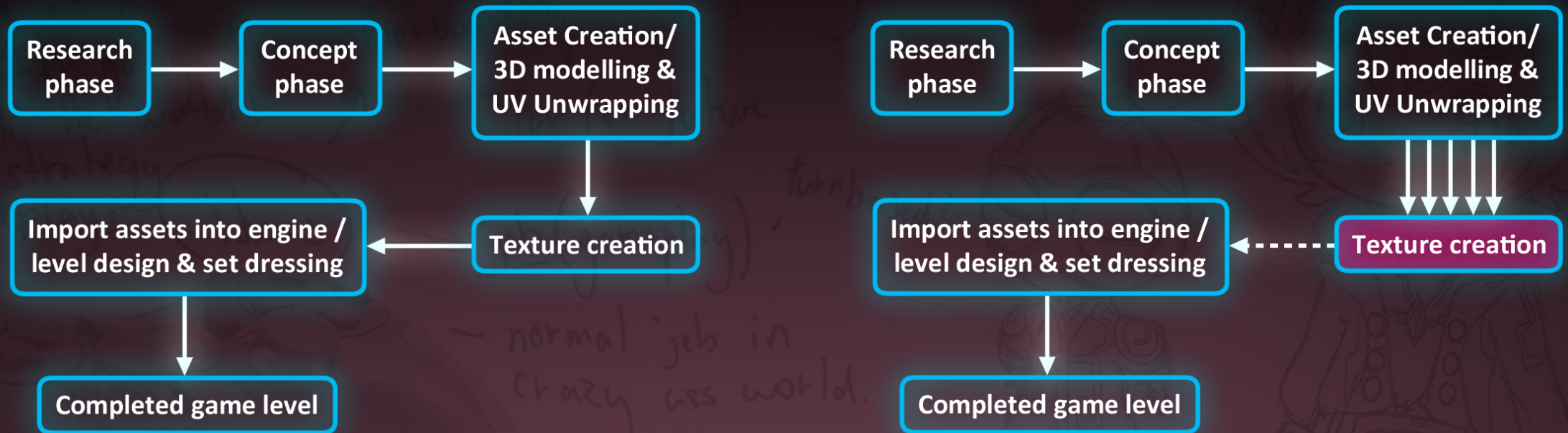
To start, identify the problem you want to address.

Then, working backward, ask yourself why this problem is occurring. Keep asking yourself "Why?" at each step, until you reach the root cause.

This is not to lay blame – it is a method used to identify shortfalls and potential setbacks!



Consider the environment props bottleneck example.



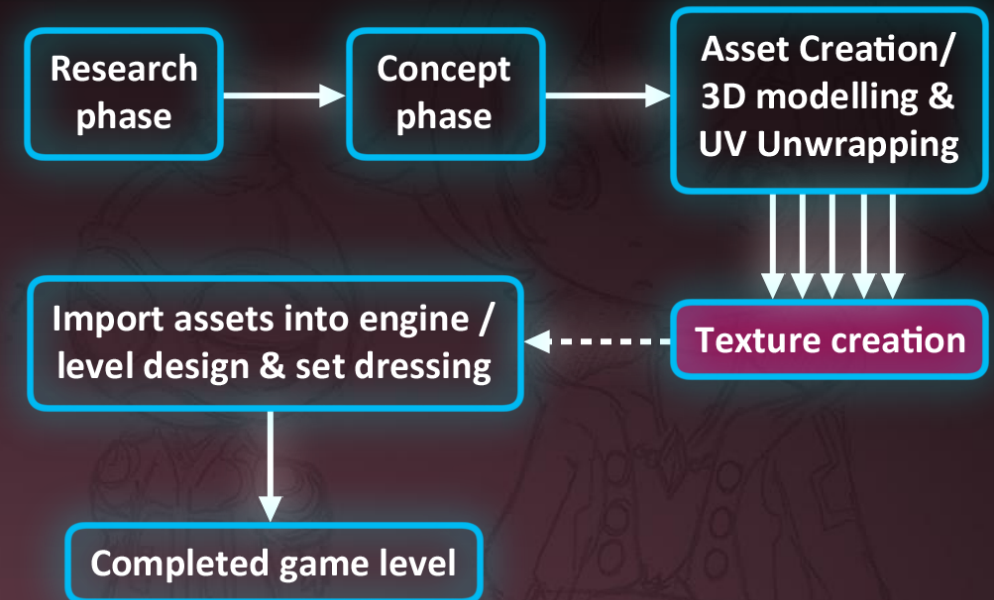
Go back to the beginning, and imagine that you have no idea why there is a delay.



ISSUE: Props are not being imported into engine.

Why?

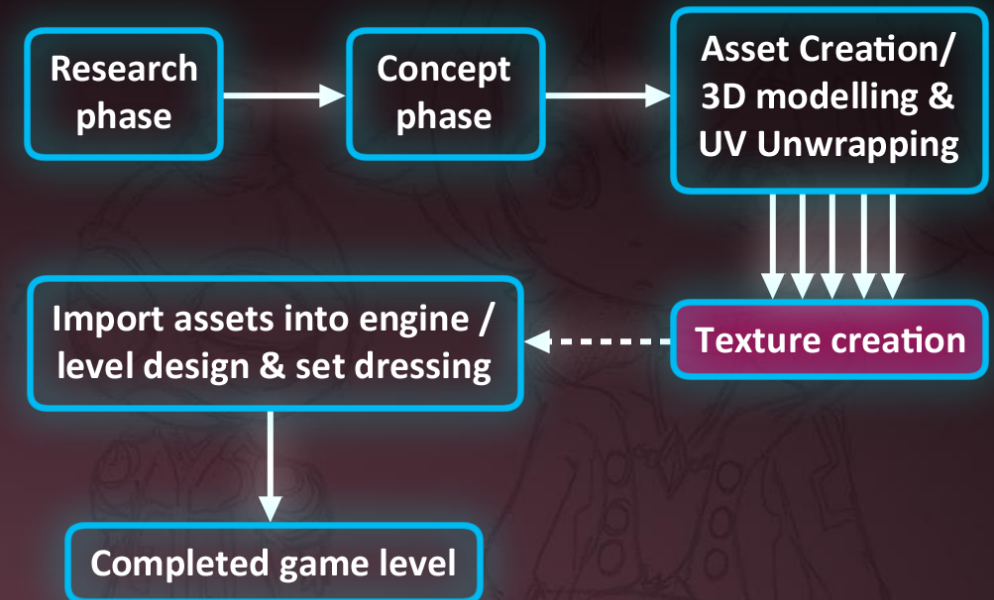
Because the environment artist claims they are not ready to be imported.





Why aren't the assets ready?

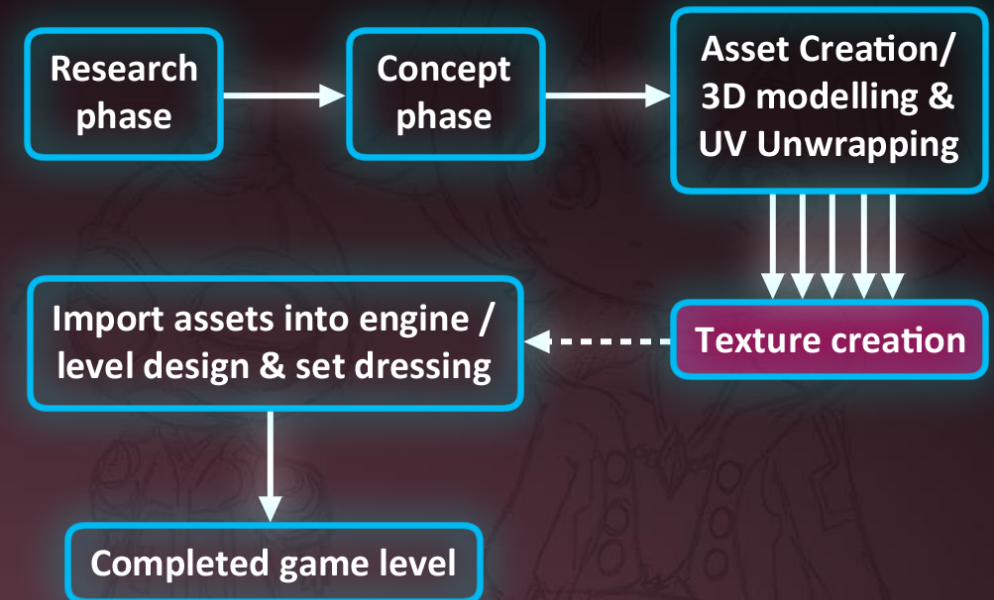
Because none of the assets have UV maps or textures completed before they are imported into the game engine.





Why don't they have completed UV maps or textures?

Each one has to be UV unwrapped and textured before use, and it is taking a considerable amount of time to complete each one.

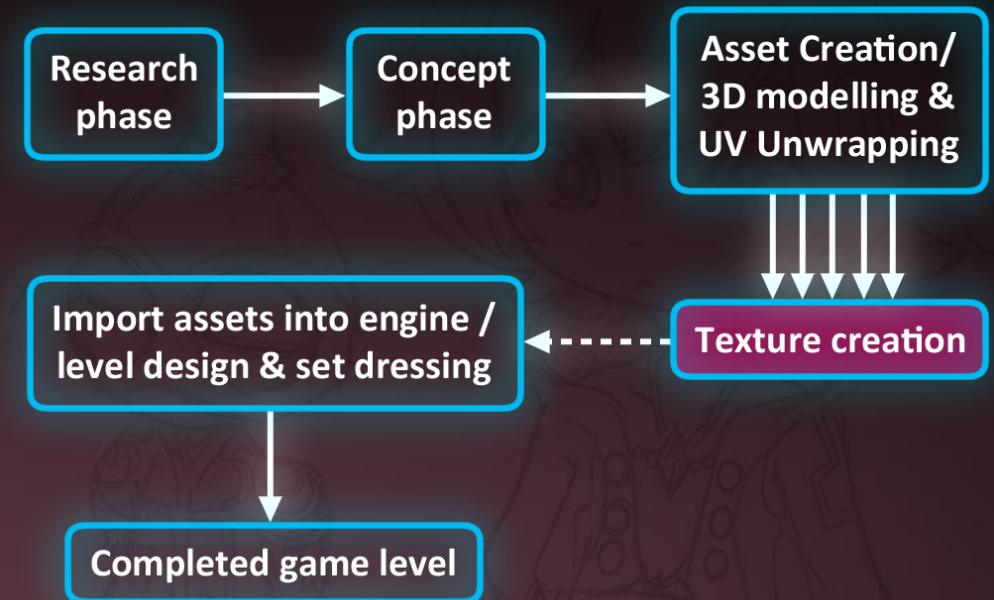




The 'Five Whys' Technique

Why is it taking so long to complete each one?

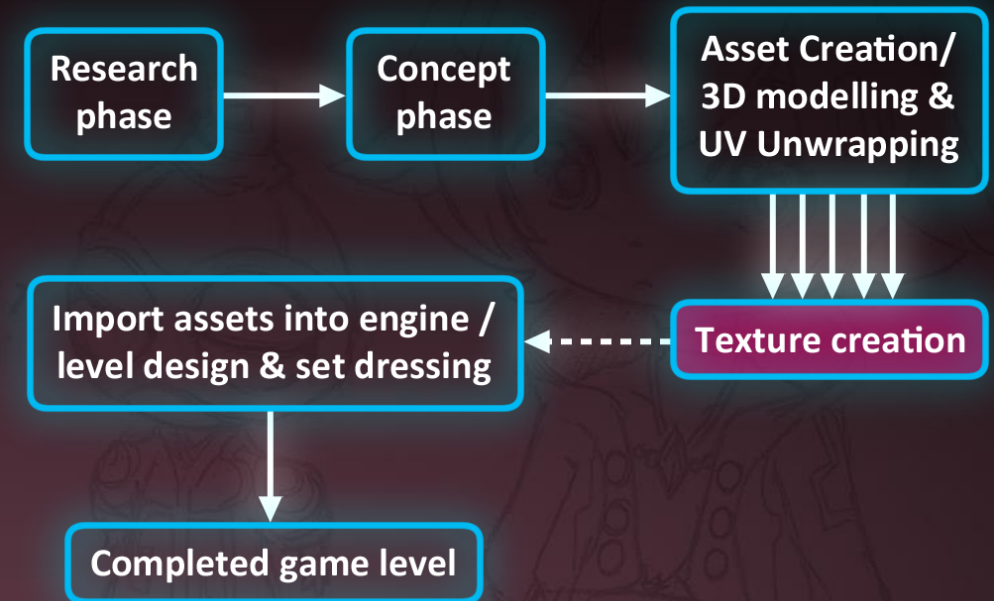
Because every model has to be UV unwrapped and textured by one of the members of the development team.





Why is this the job of only one person in the team?

Because everyone else has been assigned other tasks such as research, concepts, modelling, animation and environment design.

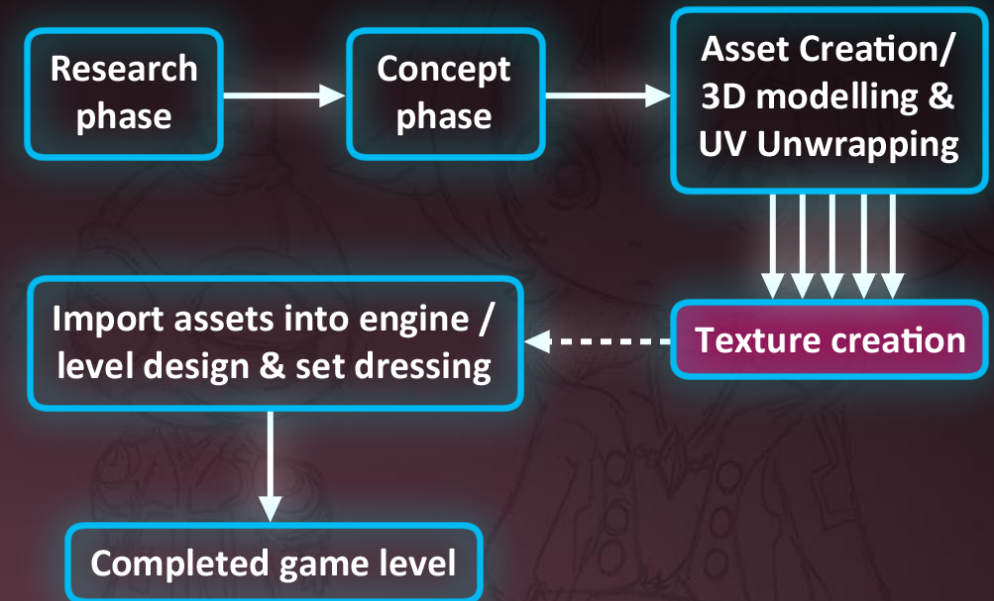




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Because everyone else has been assigned other tasks such as research, concepts, modelling, animation and environment design.

The root cause has just been identified.





ISSUE: Props are not being imported into engine.

REASON: Because everyone else has been assigned other tasks such as research, concepts, modelling, animation and environment design.

Now that the root cause has been identified, a solution can be made.

The solution is **to delegate the task to more than one person** – preferably a team member who may have finished their primary role, such as a concept artist or researcher.



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Production Bottlenecks

By working backward and identifying the root cause, the team can clearly see what needs to change in order to fix the problem.

The 'Five Whys' Technique





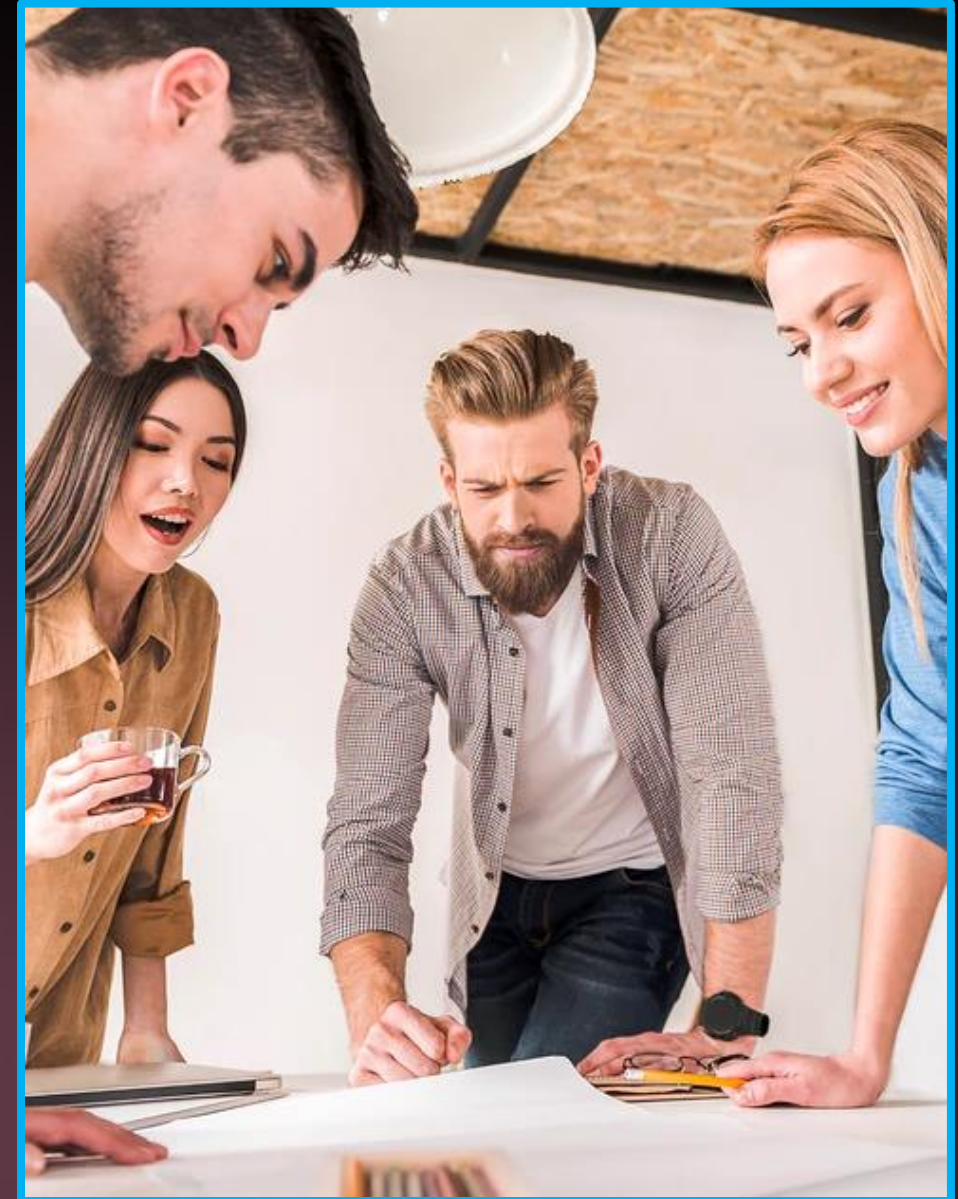
GAME THEORY & DESIGN

Production Bottlenecks

By working backward and identifying the root cause, the team can clearly see what needs to change in order to fix the problem.

This is an example of using good communication skills in a professional manner, in addition to valuable problem-solving skills for life experience - not just for games design!

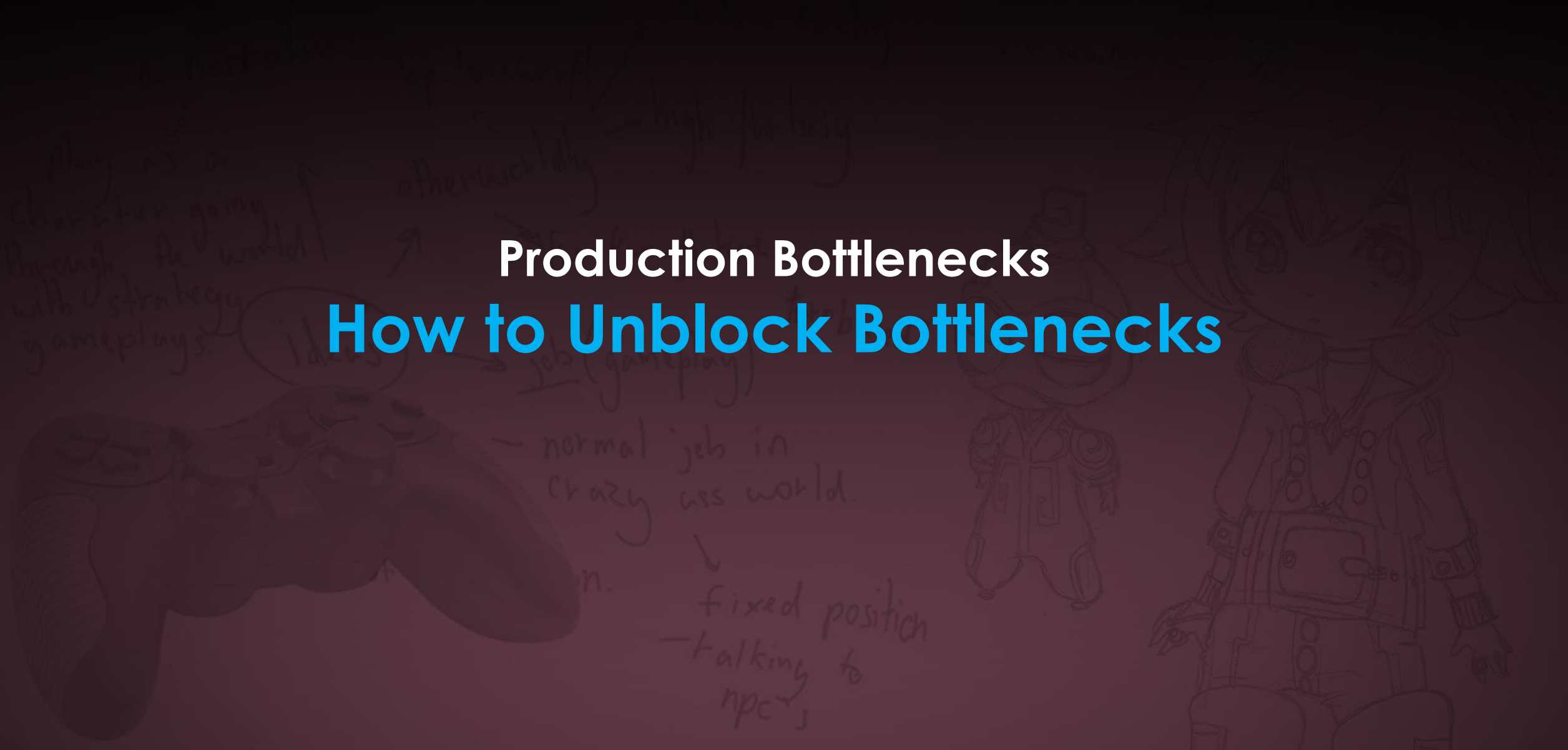
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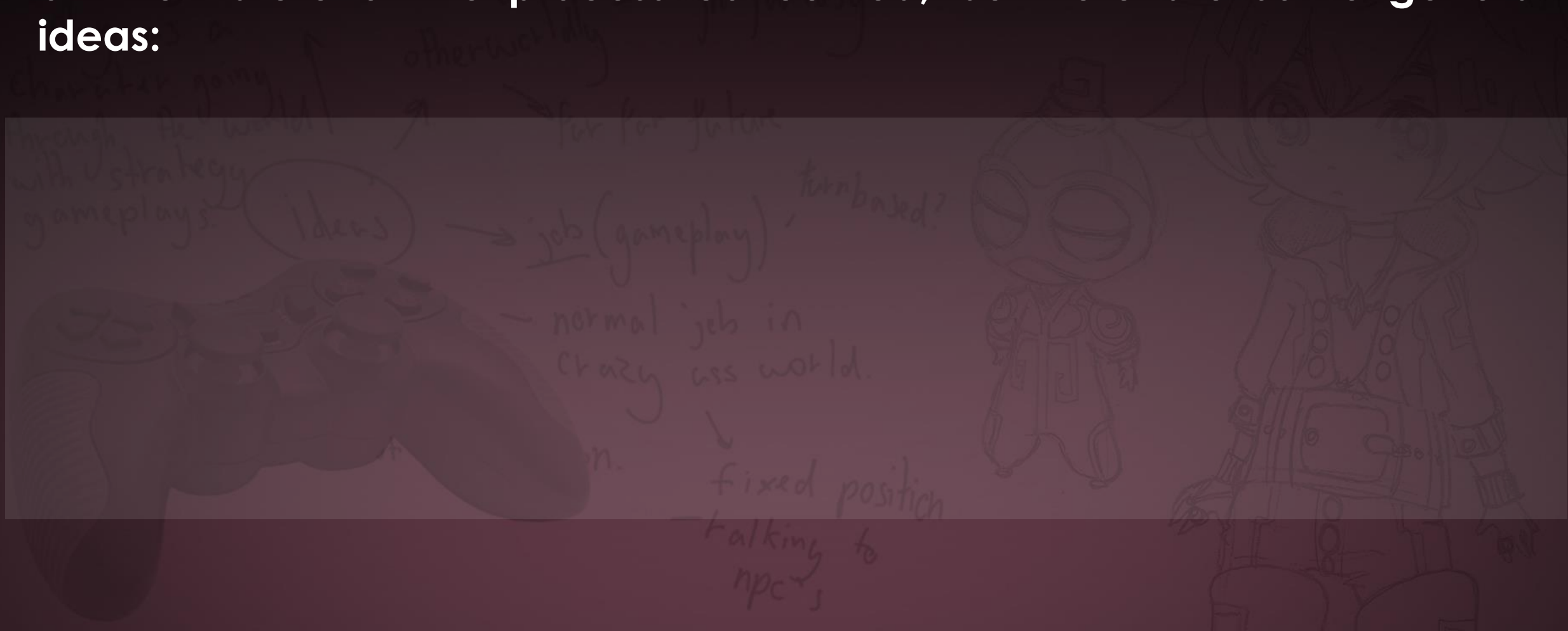
Production Bottlenecks

How to Unblock Bottlenecks





How you might increase efficiency in other situations will depend greatly on the nature of the process concerned, but here are some general ideas:





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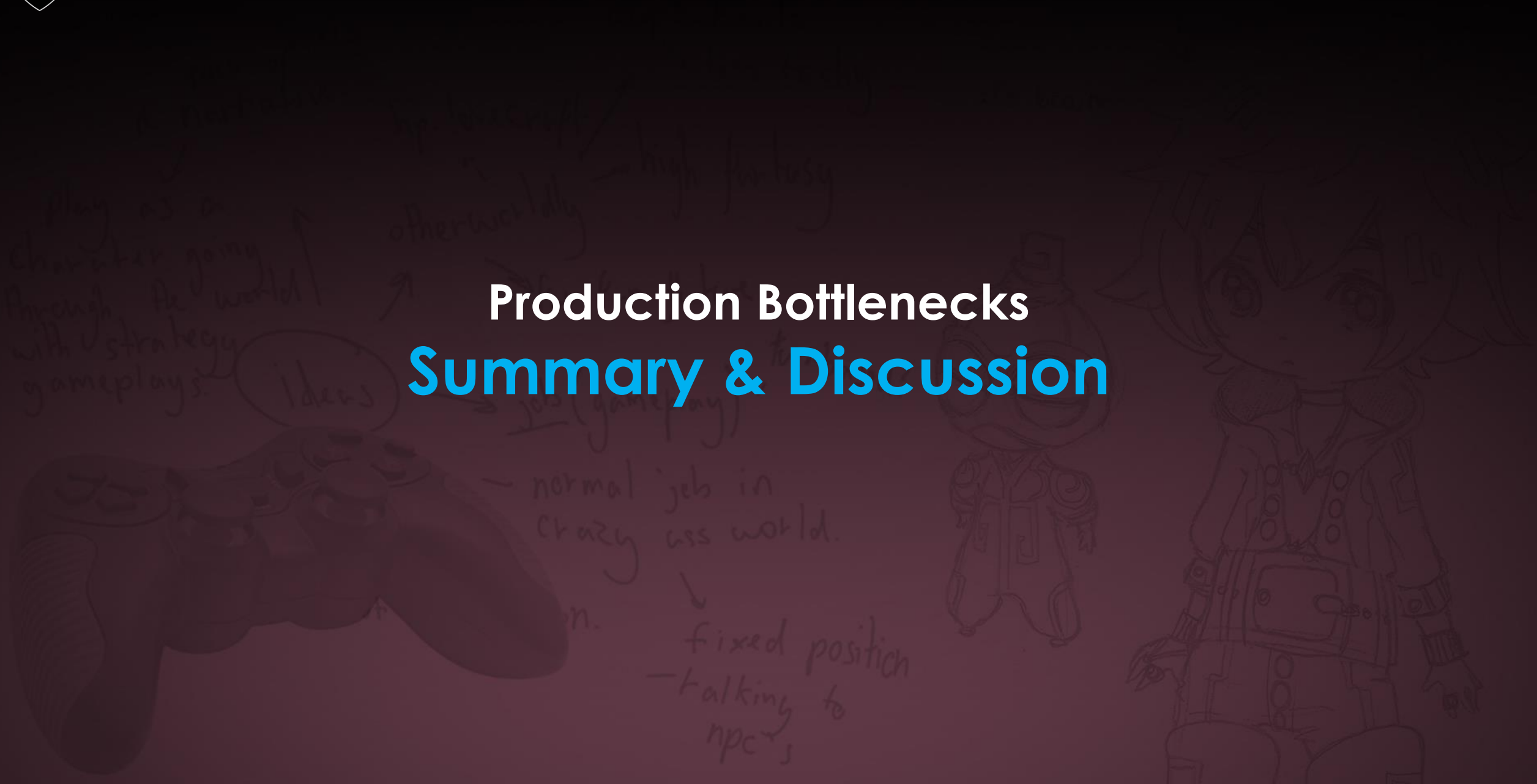


How you might increase efficiency in other situations will depend greatly on the nature of the process concerned, but here are some general ideas:

- **Remove activities from the bottleneck process that could be done by other people.**
- **Assign the most productive team members and technology to the bottleneck process.**

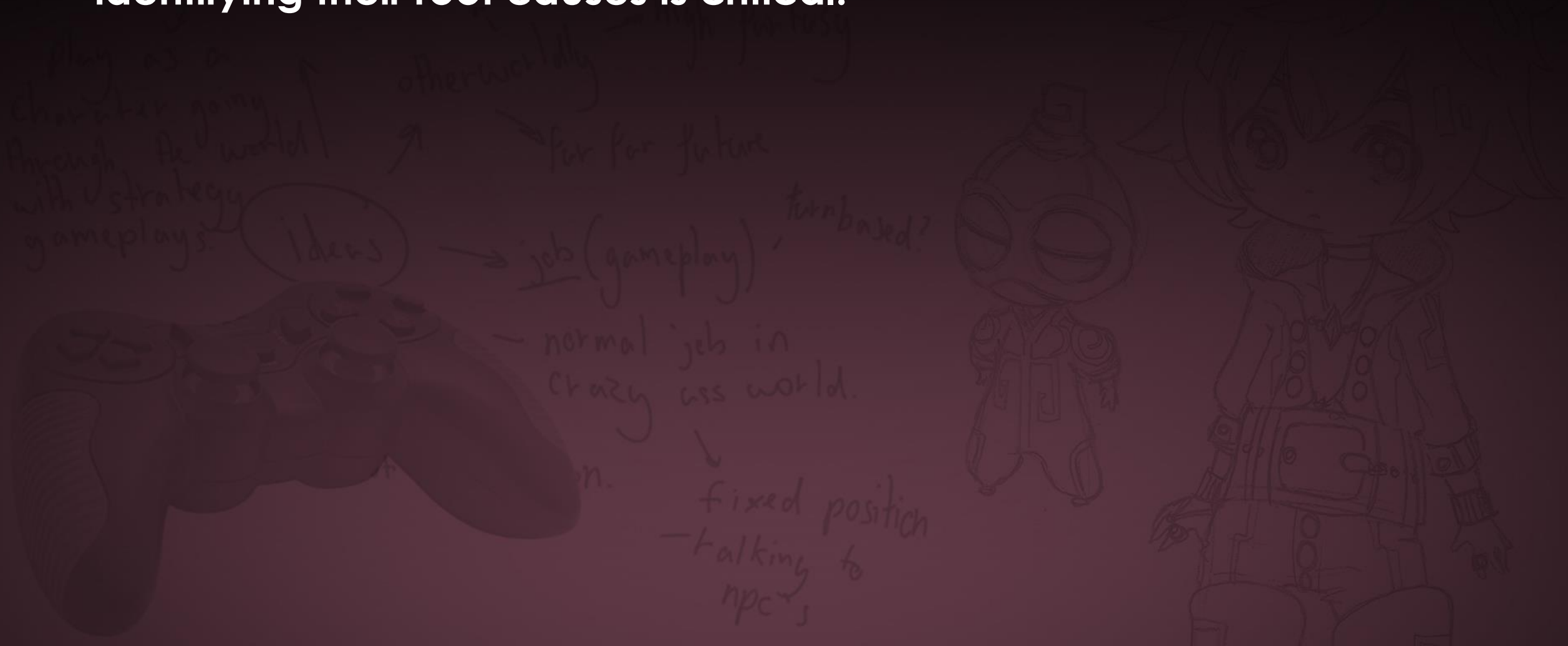


Production Bottlenecks Summary & Discussion





- **Bottlenecks can cause major problems for any company, and identifying their root causes is critical.**





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- Look for typical signs of bottlenecks – such as **backlogged work, team members waiting on other tasks, and high stress** relating to part of the development process.



- Bottlenecks can cause major problems for any company, and identifying their root causes is critical.
- Look for typical signs of bottlenecks – such as **backlogged work, team members waiting on other tasks, and high stress** relating to part of the development process.
- To make sure you identify the root cause - and not just one of the effects - try using a **Flow Chart** or the **Five Whys** technique.

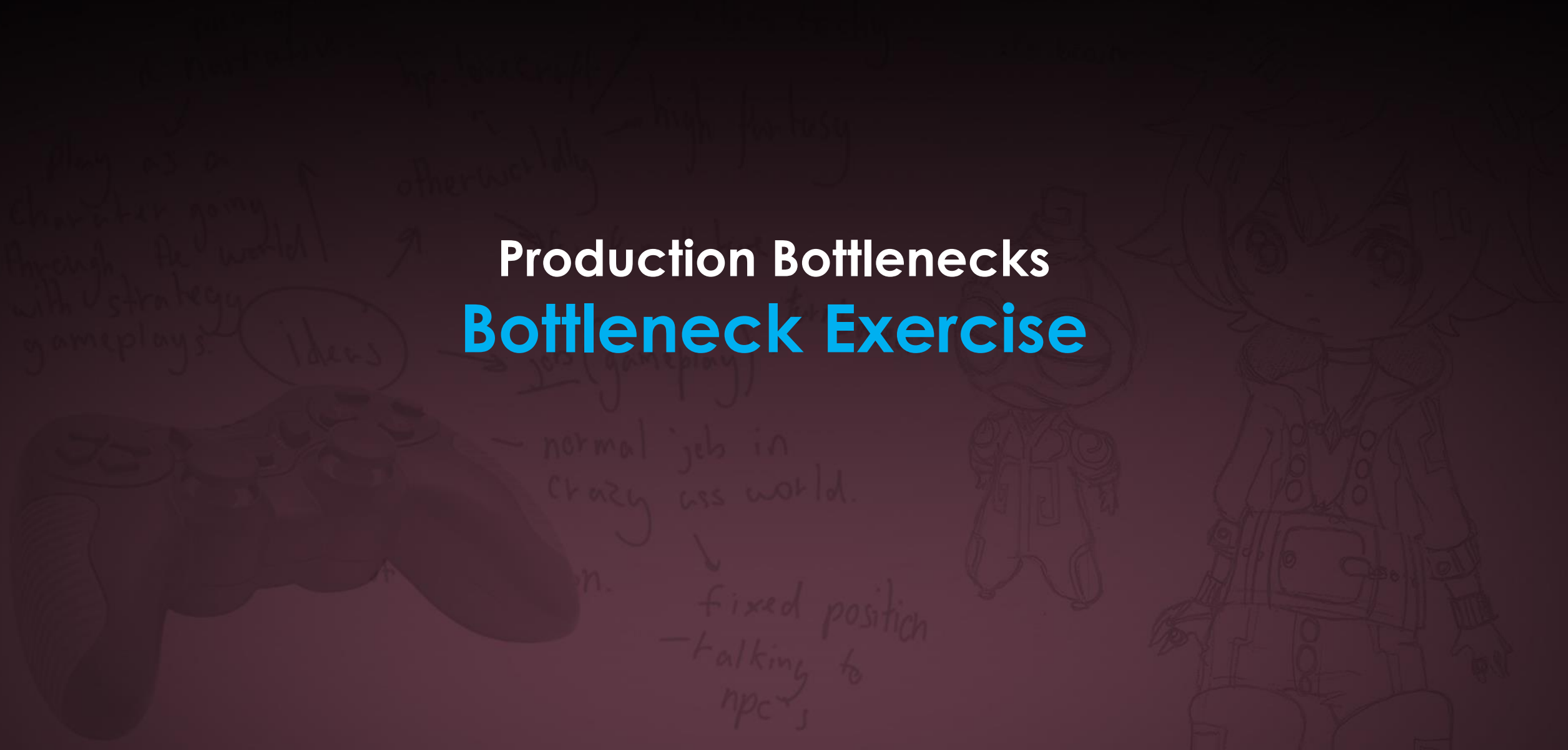


- Why do you feel it is important to identify potential bottlenecks in live projects before they develop?
- Give examples of scenarios where a development team may have to compromise, and what they might have to do to achieve their goals.



Production Bottlenecks

Bottleneck Exercise





- Form groups of 5-6 for this exercise.
- You will be given a specification for how to build a simple model using Lego. The idea is to duplicate this as many times as possible in a specified time limit.
- Roles will be designated in the team – some will be sourcing parts, others will be constructing models and others still will be moving resources between roles.

Follow guidance from your tutor and evaluate your performance.

Be aware of any bottlenecks that develop!



Alternatively:

- Create a **flow chart** for the production process in your development team.

Add names to each part of the process to help see if there may be any potential bottlenecks in production.

If so, talk to your team to find a solution.



Any questions?



Websites

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