COMP250: Artificial Intelligence

3: Behaviour trees

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Research Journal

Topic assignments

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- Linked on LearningSpace

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- I will be checking the wiki in **week 5**, and I hope to see good progress!

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Finite state machines

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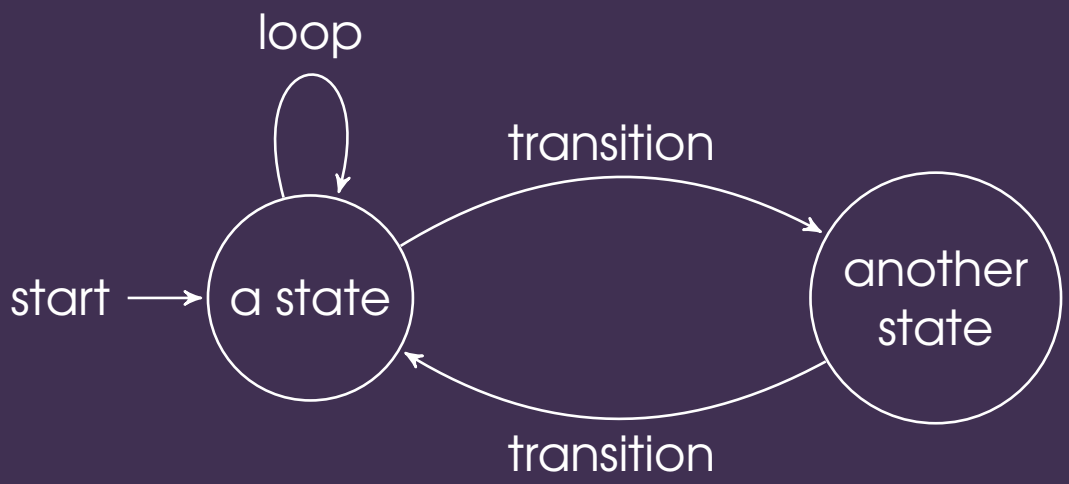
- **Inputs** or **events** can cause the FSM to transition to a different state

State transition diagrams



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- Reminiscent of **flowcharts** and certain types of **UML diagram**

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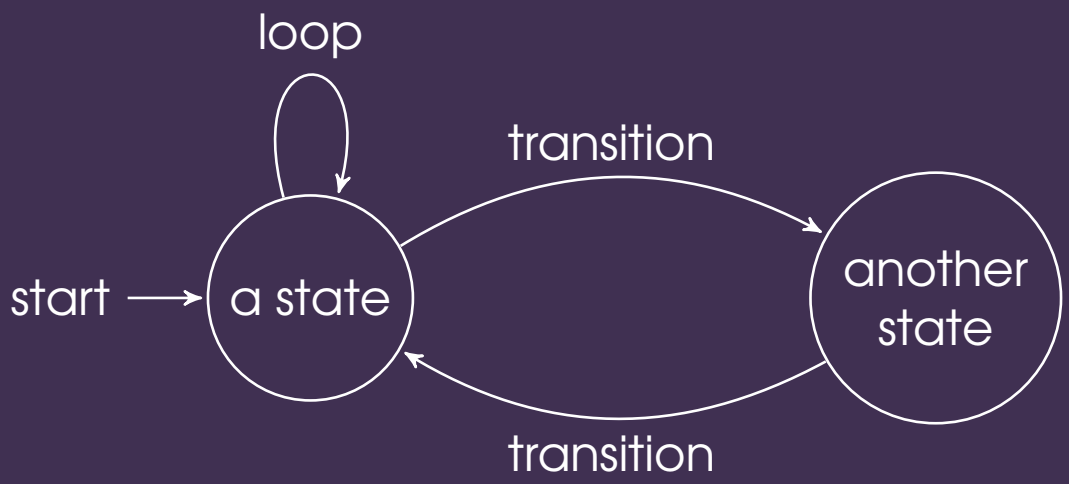

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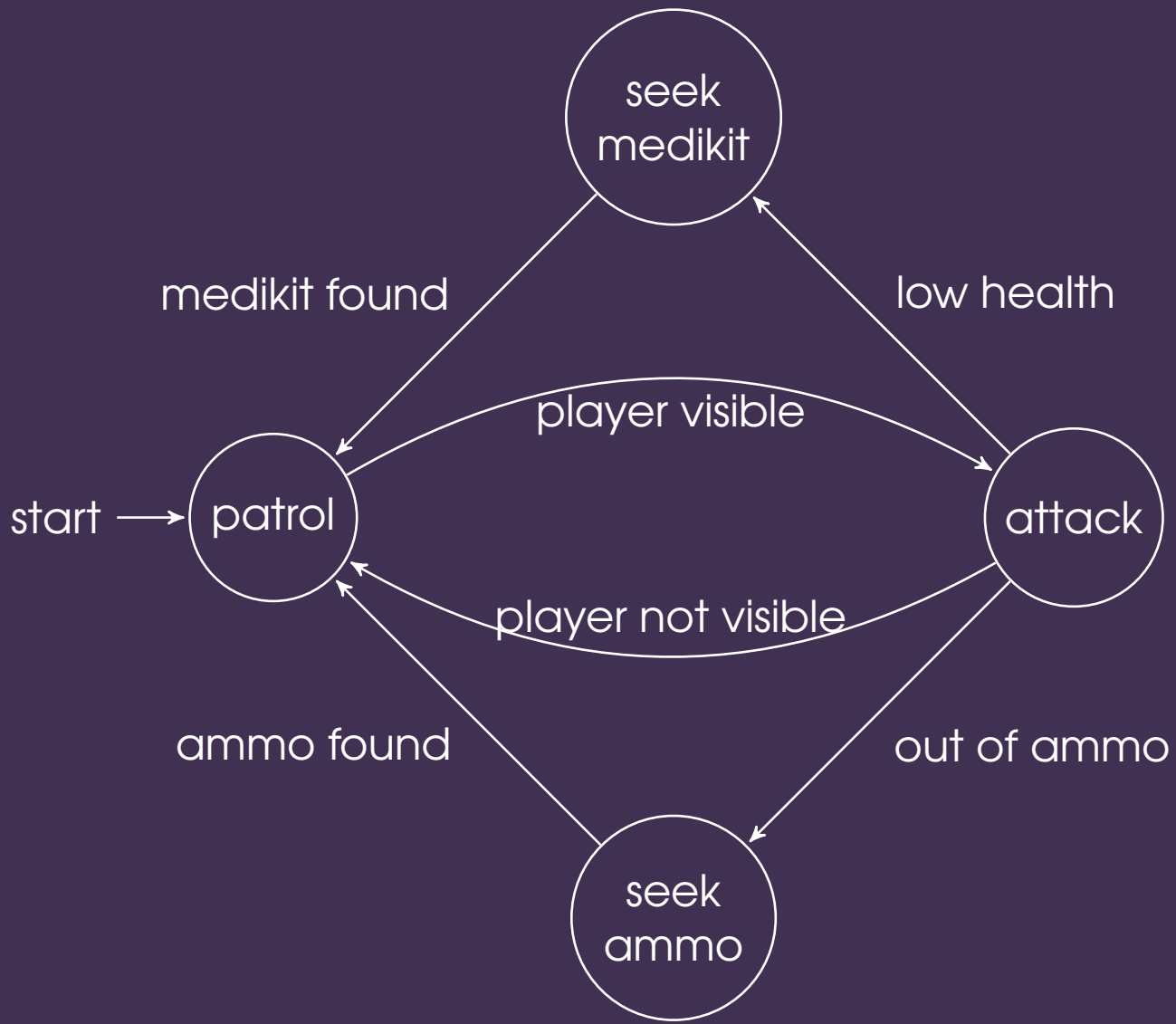
seek
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medikit found
low health
player visible
start
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attack
player not visible
ammo found
out of ammo
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Other uses of FSMs

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Beyond FSMs

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- Hierarchical FSMs
- Nested FSMs
- Stack-based FSMs
- Hierarchical task networks
- ...

Plus the topic we will be looking at today: **behaviour trees**

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Behaviour Trees

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- Also used in robotics and other non-game AI applications

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- **Unity**: numerous free and paid options on the Asset Store e.g. Behavior Machine, Behavior Designer, Behave, RAIN

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- "Running" status allows nodes to represent operations that **last multiple frames**

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  - Control which of the children are executed on each tick

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- Leaf nodes often have **parameters** to allow for reuse in different situations

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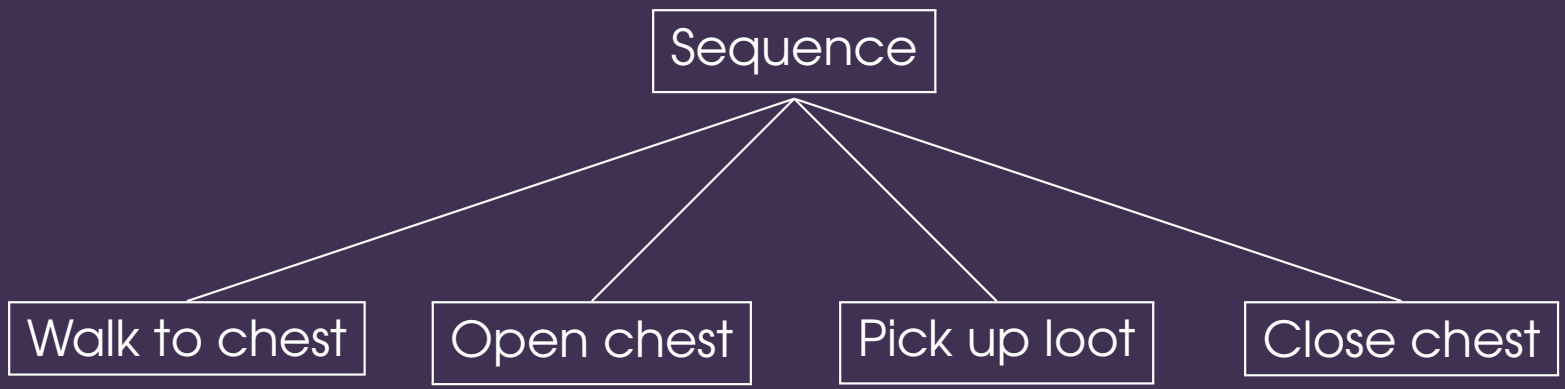

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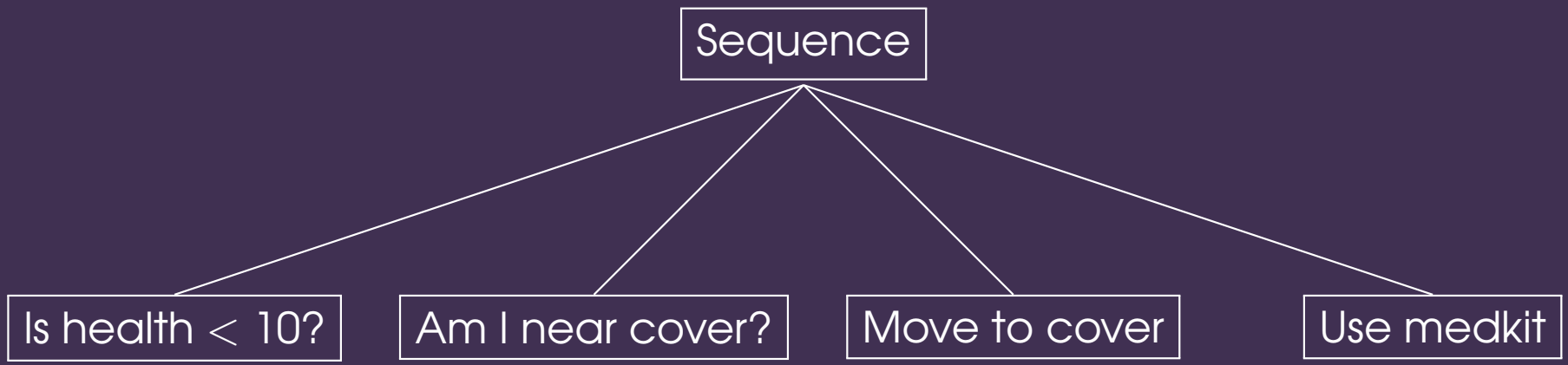

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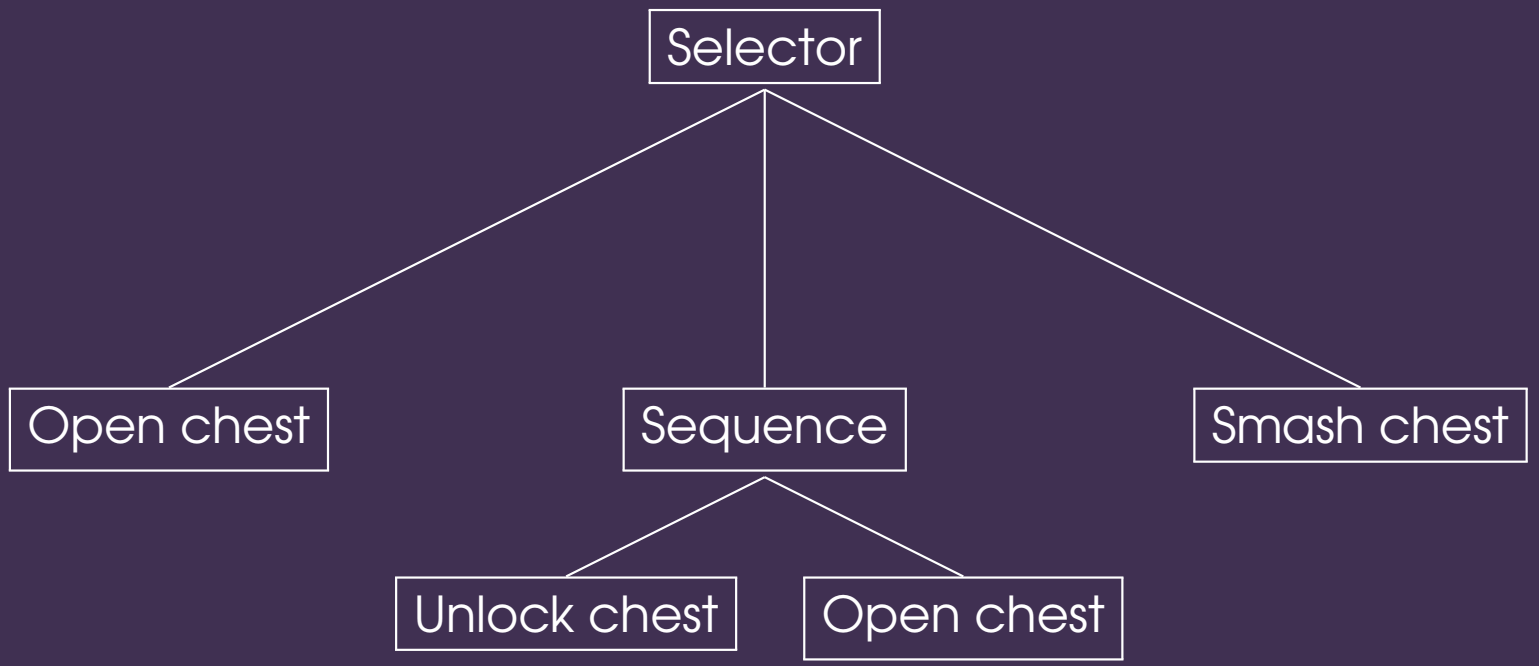

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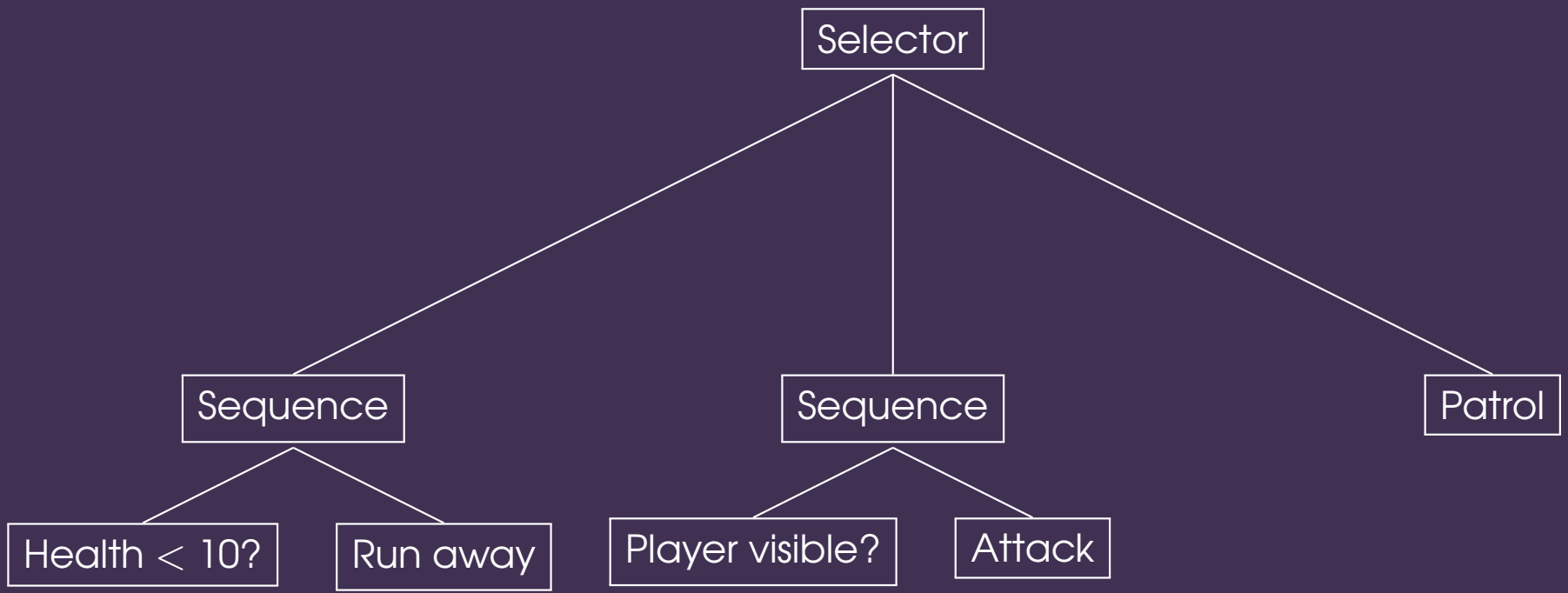

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- Sequence works like `and`, selector works like `or`

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- Most BT frameworks allow programmers to create custom composite nodes

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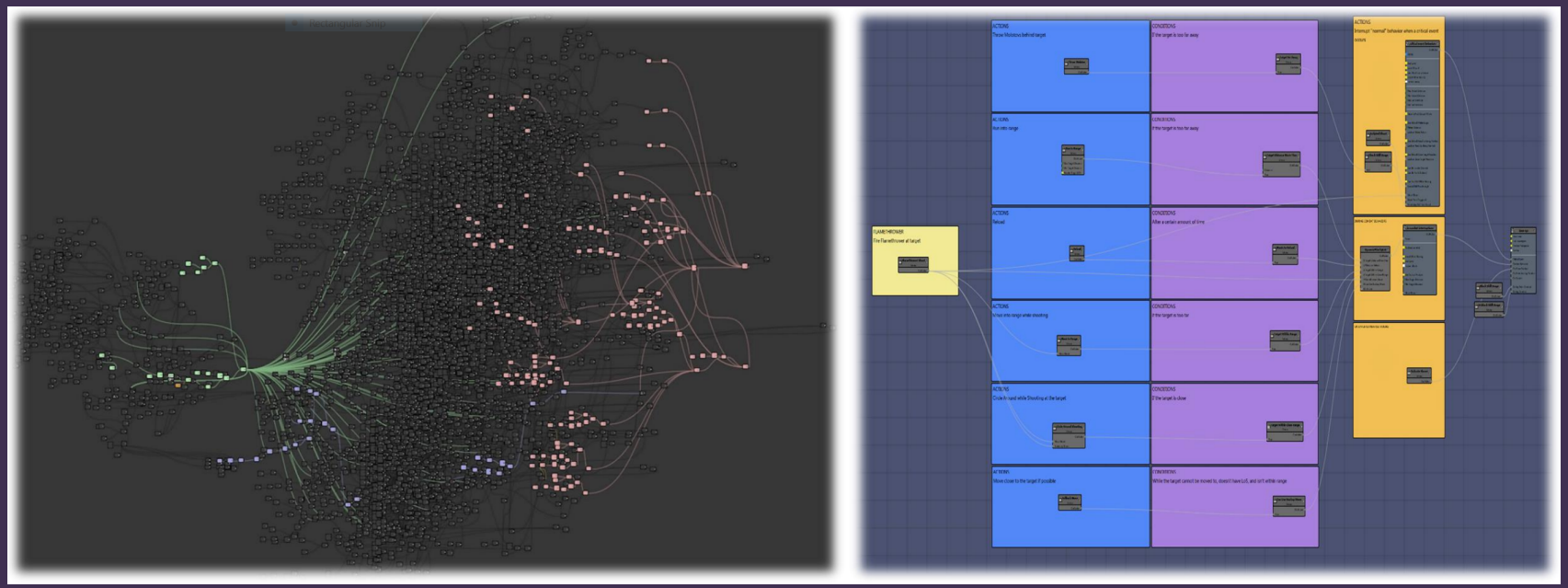
- (Shared blackboards mean that your AI has "telepathy" — this may or may not be desirable!)

BTs in The Division



http://www.gdcvault.com/play/1023382/AI-Behavior-Editing-and-Debugging

Activity

Unreal users: follow the tutorial at
`https://docs.unrealengine.com/latest/INT/Engine/AI/BehaviorTrees/QuickStart/`

Unity users: download "Behaviour Machine Free" from the Asset Store, and follow the tutorial at
`https://youtu.be/ZVl1FM24OXg`

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Portfolio task proposals