COMP250: Artificial Intelligence

7: Navigation

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Research journal

Research wiki check-in

Research journal submission

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Pathfinding

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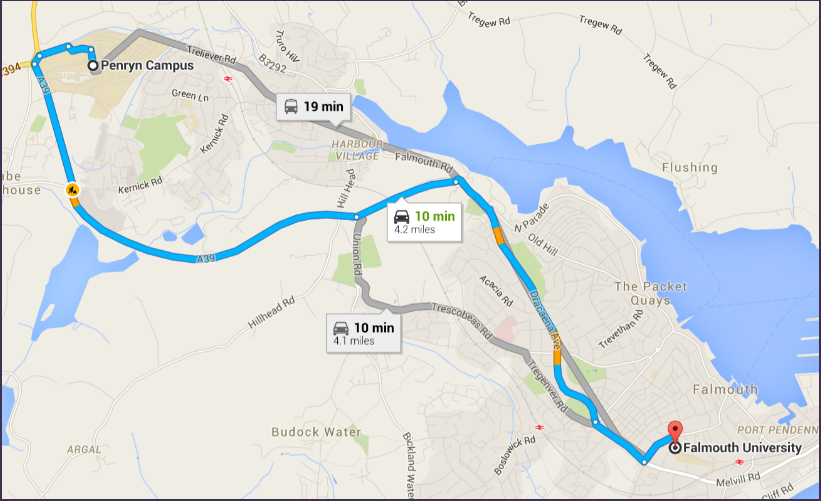
  - "Shortest" in terms of edge lengths — could be distance, time, fuel cost, ...

Applications of pathfinding



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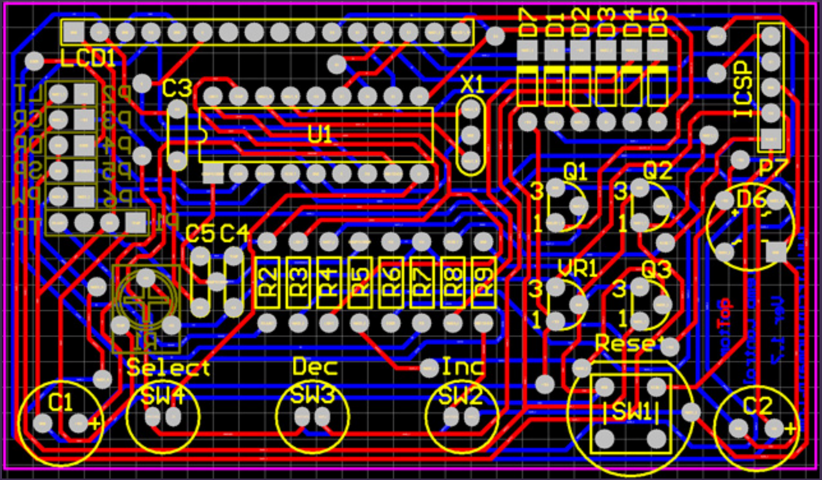

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- Open `07_pathfinding` in PyCharm

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  - Often implemented with a **priority queue**

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- ... but is not the most efficient algorithm for doing so

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  - Heuristics are often used to prioritise search, i.e. explore the most promising options first

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- Different $h(x)$ can lead to different paths (if there are multiple "shortest" paths)

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  - Repeat until there are no more points that can be removed

Navigation meshes

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- A* works on any **graph**
- But what if the game world is not a graph? E.g. complex 3D environments

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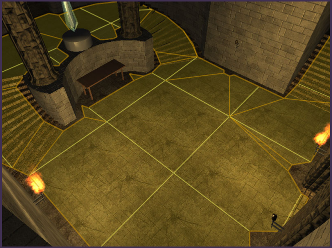

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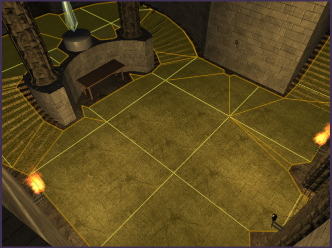

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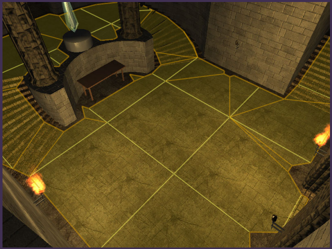

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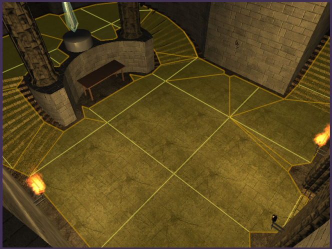

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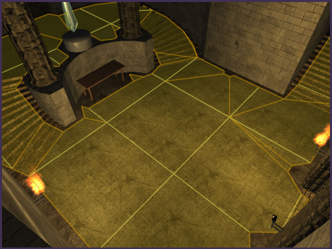

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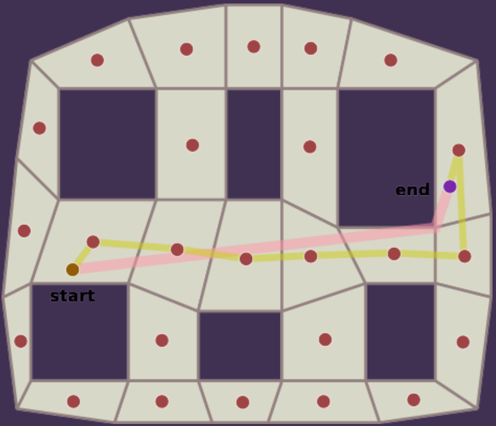
  - Generate graph from polygons

Meshes to graphs



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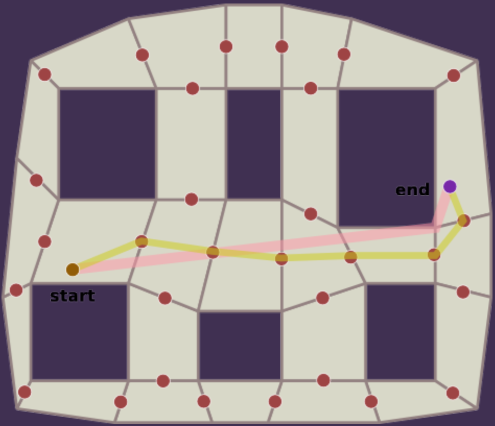

Centres of edges

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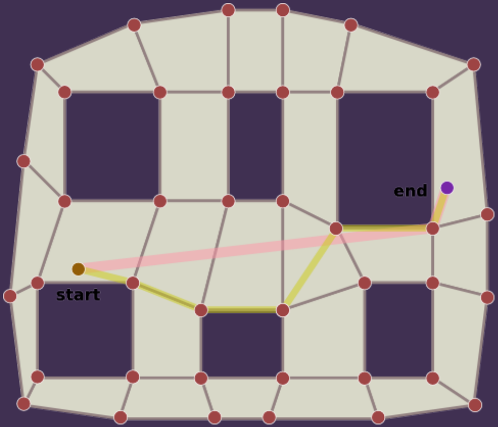

Vertices of polygons

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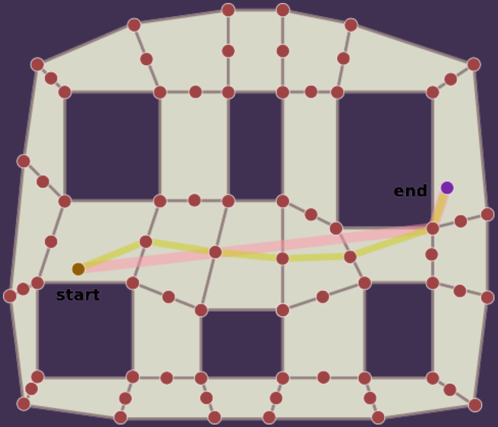

Hybrid approach: edges and vertices

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- **Dynamic environments**: may need to re-run pathfinder if environment changes (e.g. movable obstacles, destructible terrain)

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