Final year projects
or: How I Completed My Credits Requirement and Turned It Into a Ph.D.

Matthew Bedder

Background: Me

Studied Computer Science with Artificial Intelligence MEng

- I started in 2009, before this building existed…

Undertook a placement at BAE Systems ATC

- Satellites! Secret stuff!

Currently studying towards a Ph.D. in games AI

- Based entirely off my MEng project

Background: Final Year Projects

Final year projects are a substantial amount of work

- Roughly a third to half of your final year
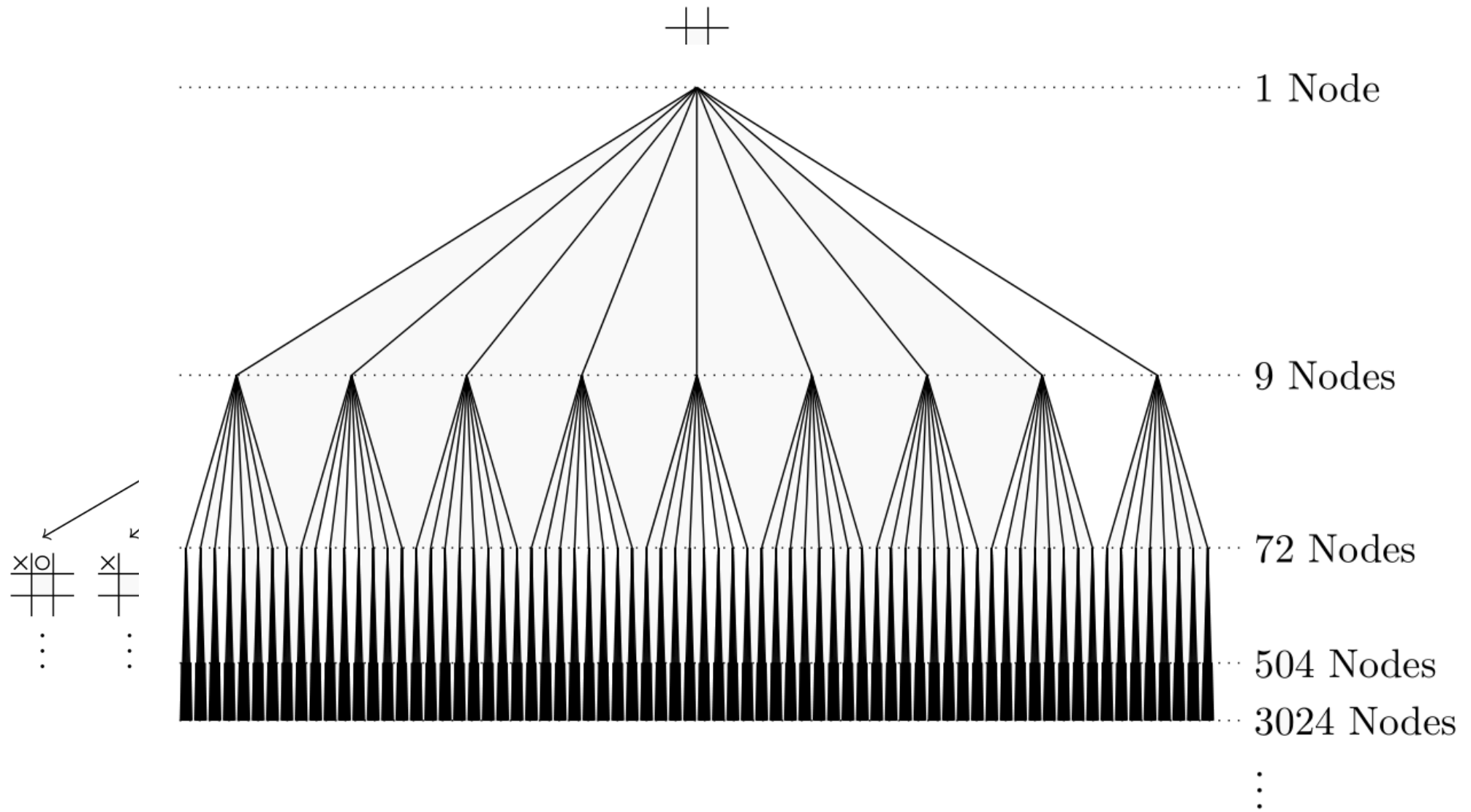- For me it was 50 credits, or ~500 hours

Tackling complex topics

Can be in a area in which you don't have much experience

- Bidding process for projects

Monte Carlo Tree Search

There's this technique called Monte Carlo Tree Search…

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We cannot search the whole tree, only the interesting bits

Exploration versus Exploitation

- Explore bits of the tree we know little about
- Exploit bits of the tree we know are good

Monte Carlo Tree Search

MCTS was proposed in 2006

Revolutionised games AI for many board games

Not used much in commercial video games

- Video games have significantly larger challenges

There are as many states of Civilization II as there are atoms in the universe 10,000,000,000,
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00, 000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 times over

Hierarchical Monte Carlo Tree Search

I proposed a method for guiding searching

Search over simplification for strategy, and the full game for tactics

I could bore you with lots of detail…

Results!

I had a lot of fun

I managed to turn my final year project into a Ph.D. topic

- Despite having no experience in the area…
- …and it being different from the original proposal

Currently two games companies want to use me/my research :D