

# Affordances & Planning (in Minecraft)

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# Quick Refresh

- Value Iteration searches over *all possible future states*
- Humans prune possibility space by reasoning in terms of *affordances*
- $\therefore$  Let's do the same for an MDP ( $\Rightarrow$  AMDP)

# What have we been up to?

- Grid worlds
- BURLAP
- Mineflayer & Minecraft
- “Spicing up” our  $T$  matrix in the AMDP model.



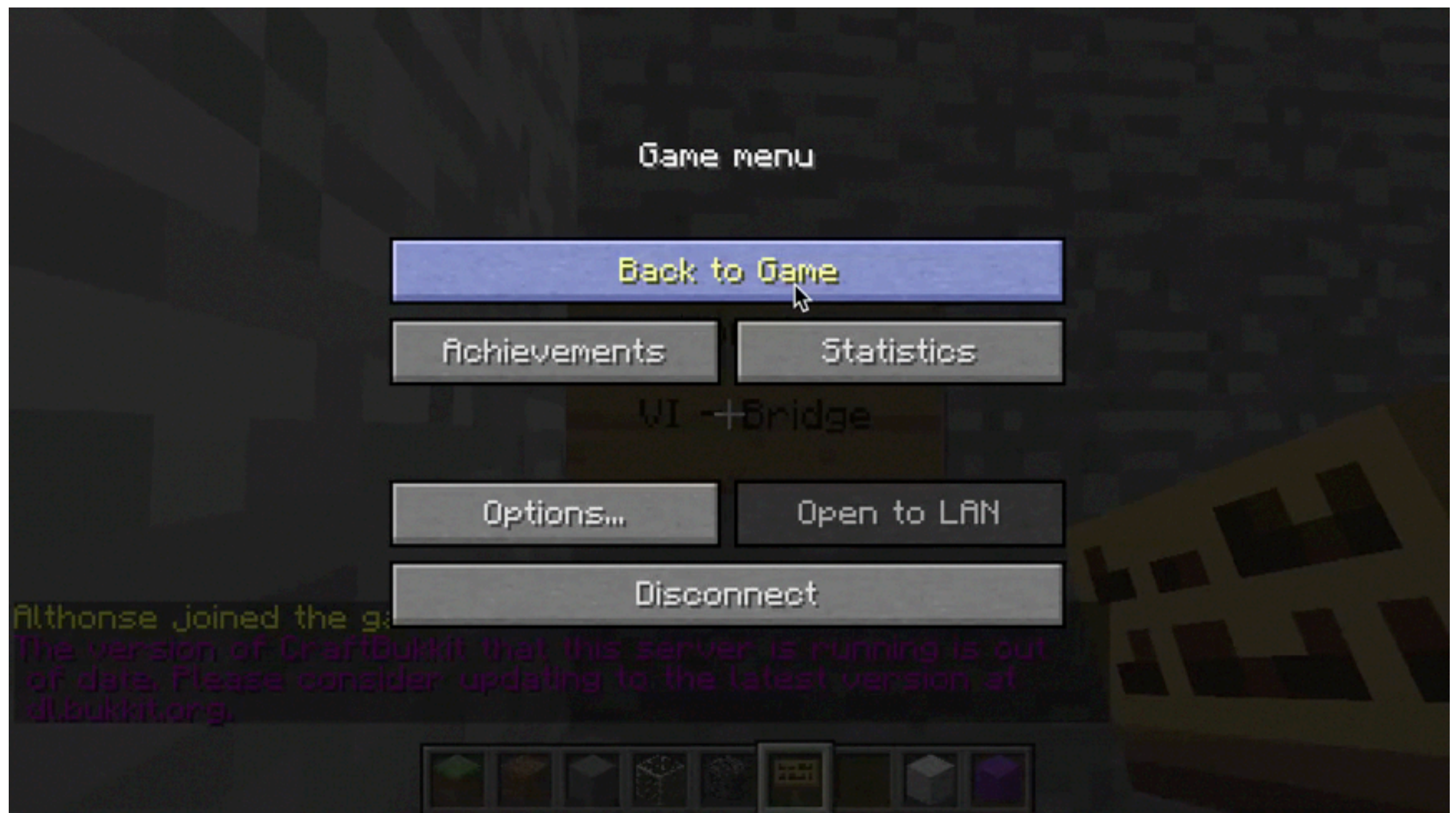
# The Minecraft Playground

# The Tasks

- World 1: Flat Area (basic path planning)
- World 2: trench of width 2 with a bridge
- World 3: trench of width 1, need to **build** a bridge
- World 4: trench of width 2, need to **build** a bridge
- World 5: trench of width 3, need to **build** a bridge



World 1



# World 2

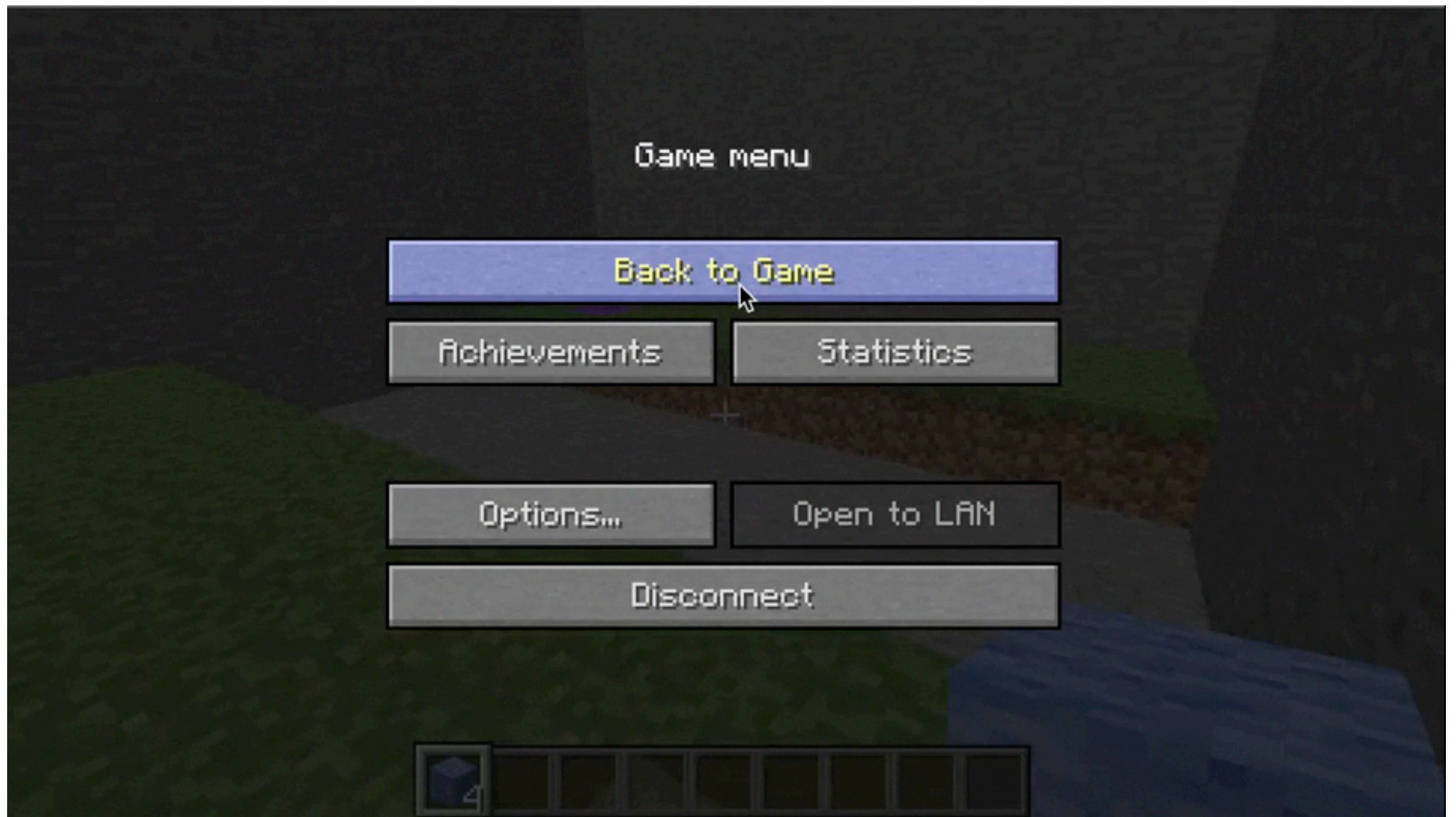




# World 3

*TODO : add final video*





Human Player

# Results

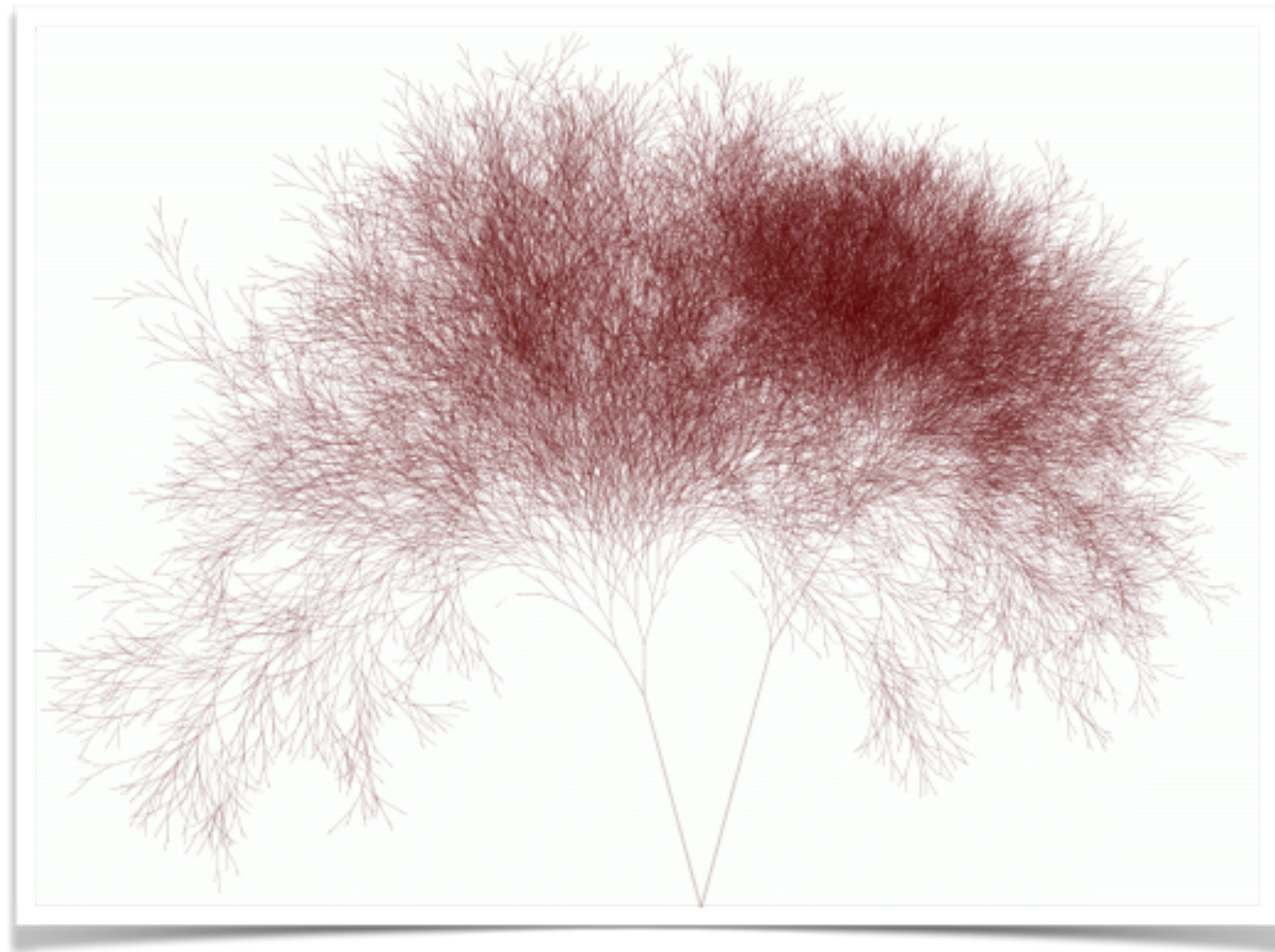
	<b>Basic VI</b> (# = iterations to converge)	<b>Human</b> (# = Avg. seconds for a new player to solve)	<b>Our Version</b> (?)
<b>World 1</b> (flat plane)	6 <small>(x100)</small>	5s	?
<b>World 2</b> (trench with a bridge)	7 <small>(x100)</small>	5s	?
<b>World 3</b> (small trench, build bridge)	12 <small>(x5000)</small>	7s	?
<b>World 4</b> (medium trench, build bridge)	?? <small>(x15000)</small>	20s	?
<b>World 5</b> (large trench, build bridge)	?? <small>(x4000000)</small>	...	?

Key:

= Reached Goal

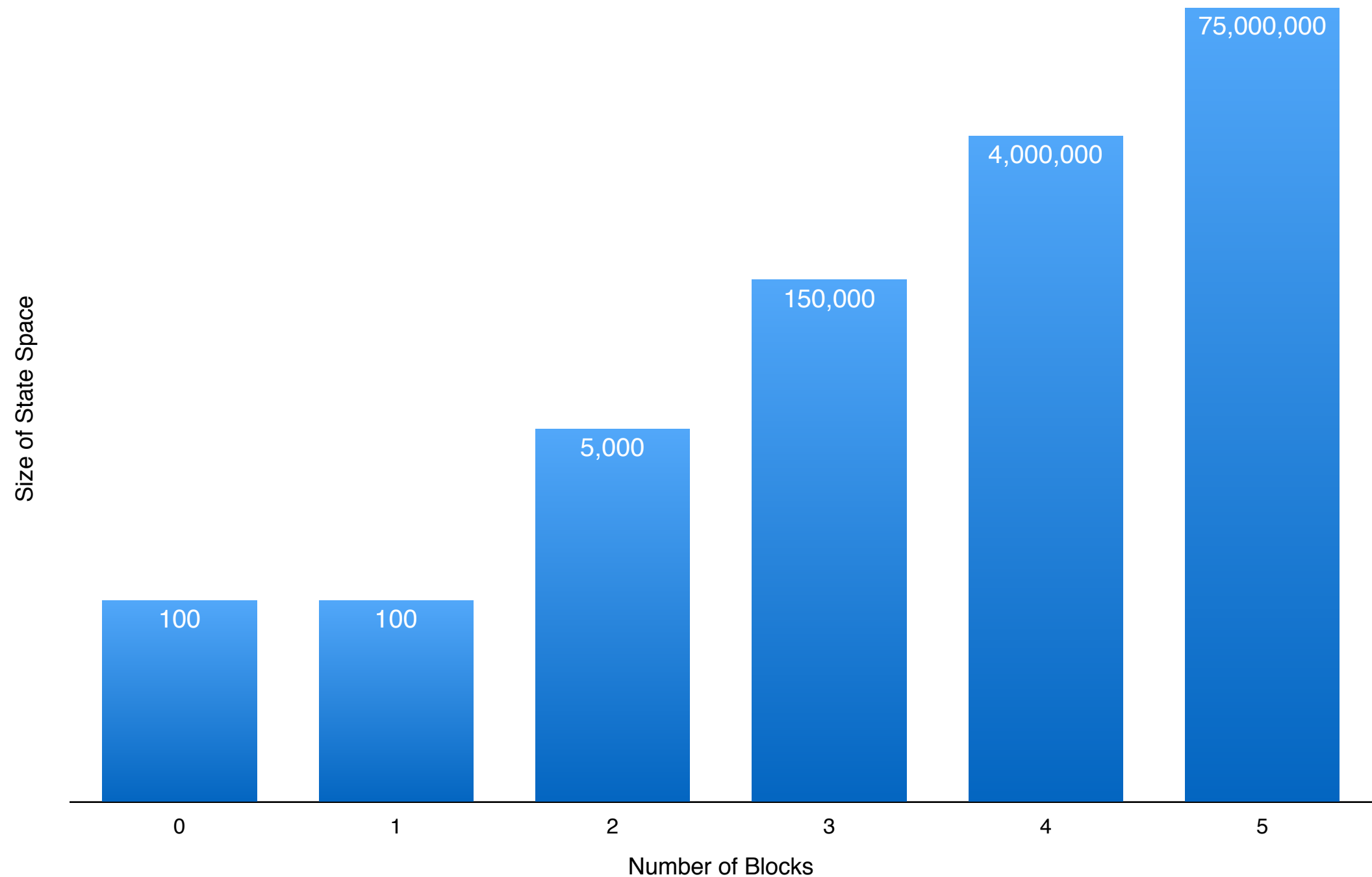
= Failed to Reach Goal

# Why is VI bad?



# State Space Explosion

(10x10 world)



# Simplifying Assumptions

- Only *one* placement action
- World is a 10x10x2 prism
- Bot is given the minimum number of blocks needed to complete each task (up to a maximum of 3, for now)
- No destruction
- Can't jump or walk into a hole



# Schedule

Implement our version of VI

Nov 20

Finish Evaluation

Nov 26

Finished with Template Language

Dec 3

