

# Two-step Constructive Approaches for Dungeon Generation

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# Minidungeons 2

- 2D, Rogue-like Dungeon Crawler
- Win: Find the exit
- Lose: 0 HP



Blob



Goblin



Sorcerer



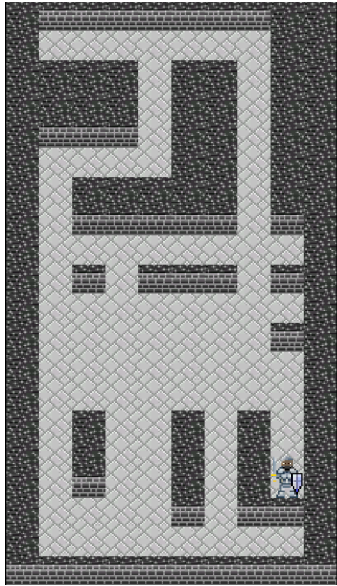
Ogre



Minitaur

# Game Elements

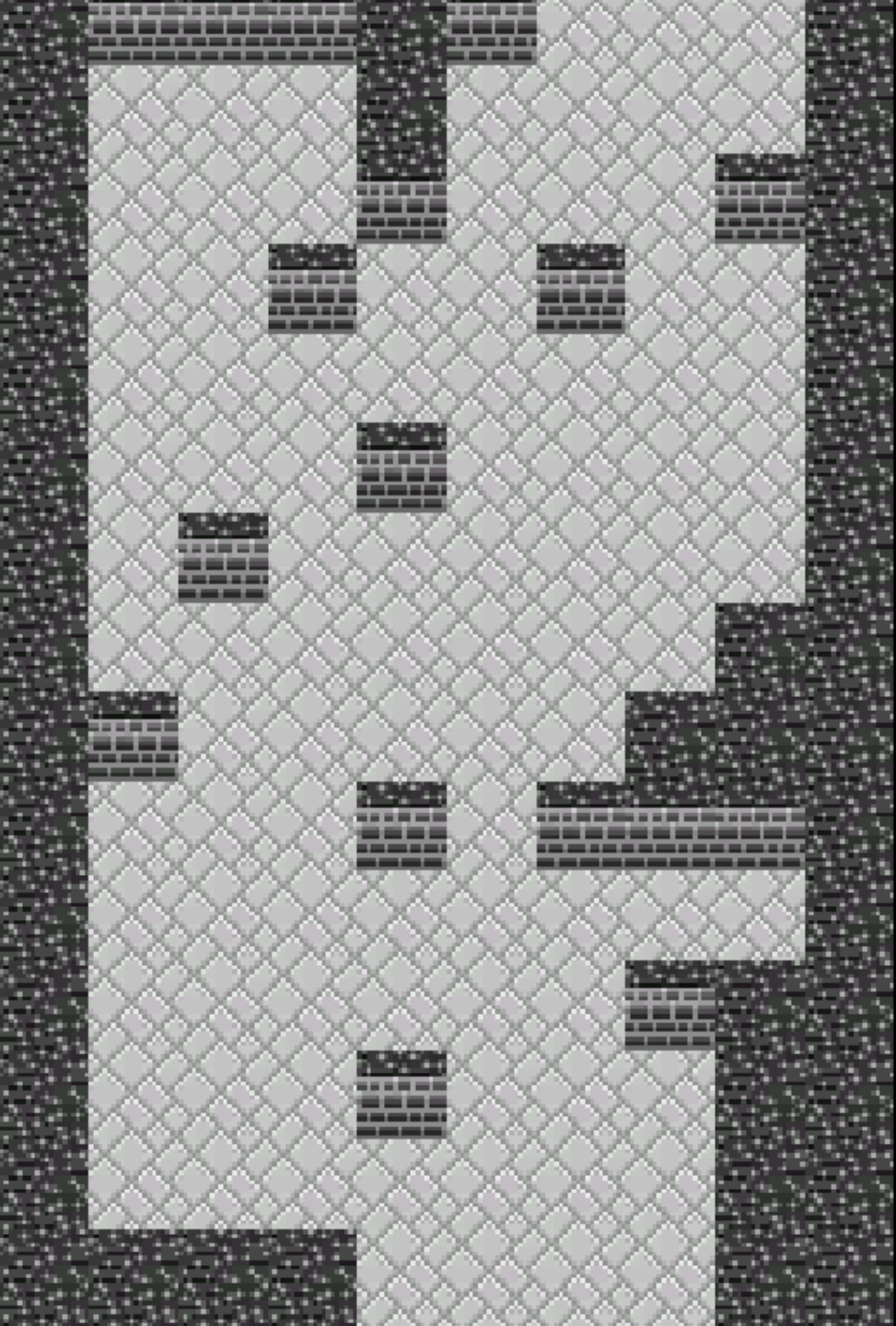
# 2-step Generation



Layout Creators: architecting the walls and the floors



Game Element Furnishers: placing elements within the game

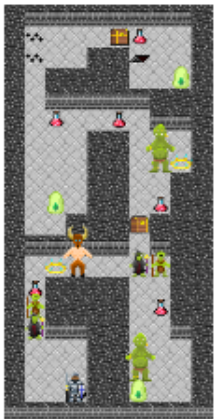


# Layout Creators

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- Constraint (CC)
  - TinyDungeon-inspired
- Cellular Automata (CAC)
  - Neighbor-determined generation
- Agent (AC)
  - \*Digger agent

\* Shaker, Noor, et al. "Constructive generation methods for dungeons and levels." *Procedural Content Generation in Games*. Springer, Cham, 2016. 31-55.



(a) CC-CF



(b) CC-CAF



(c) CC-AF



(d) CAC-CF



(e) CAC-CAF



(f) CAC-AF



(g) AC-CF



(h) AC-CAF



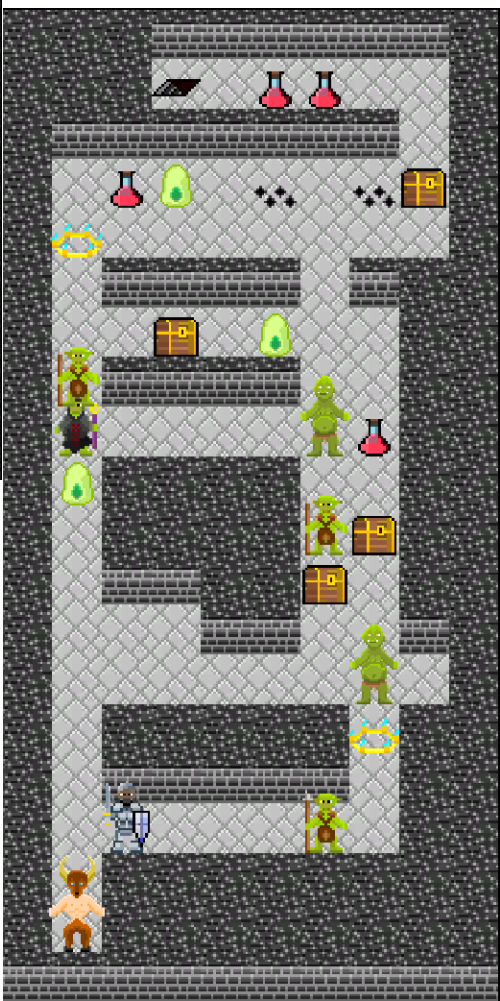
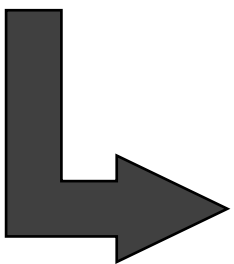
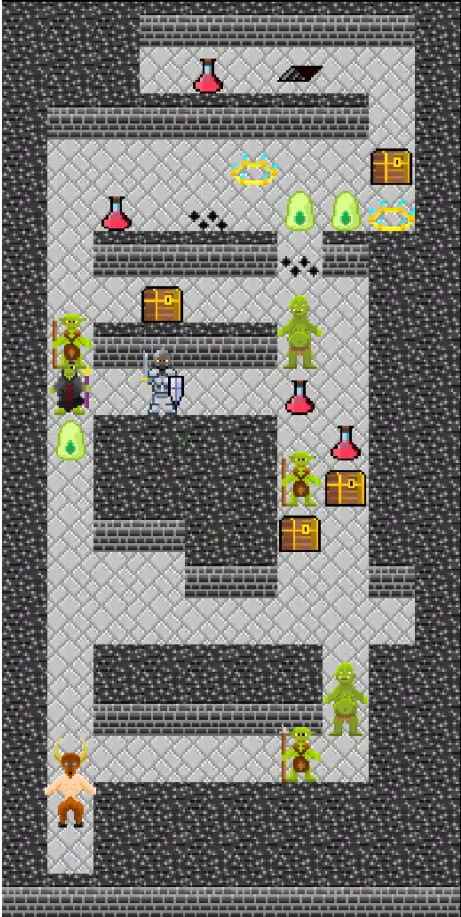
(i) AC-AF

# Game Element Furnishers

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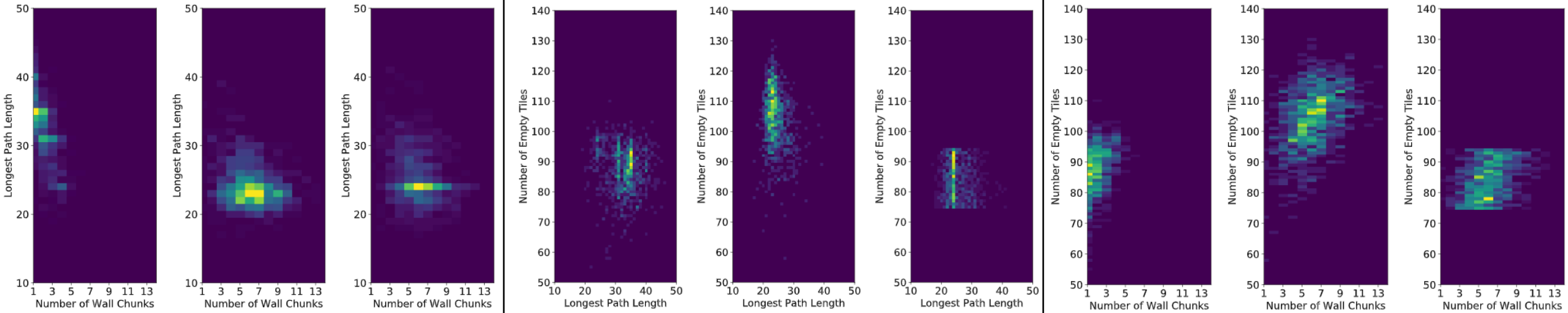
- Constraint (CF)
- Cellular Automata (CAF)
- Agent (AF)





# Agent Furnisher (novel!)

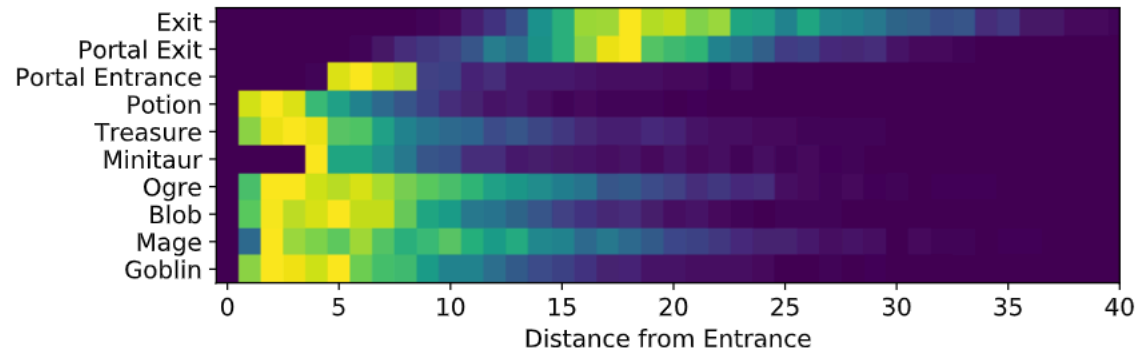
- Element = player = own heuristic
- One-step lookahead
- 45 turns



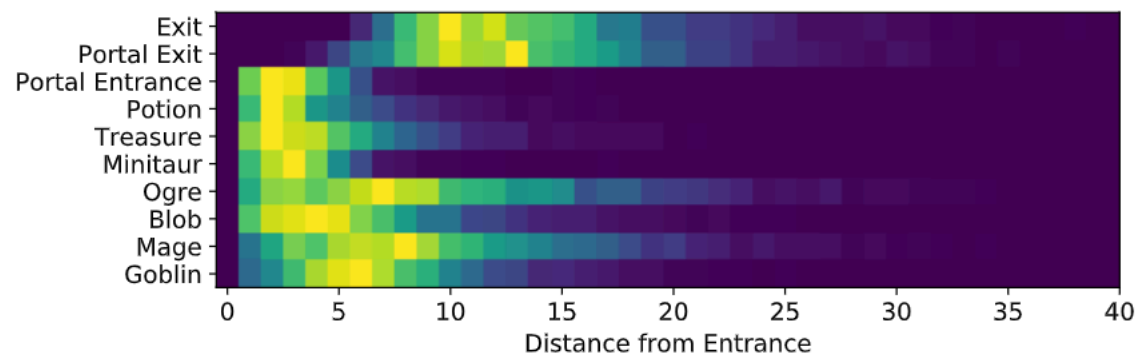
## Evaluation – Layout Analysis



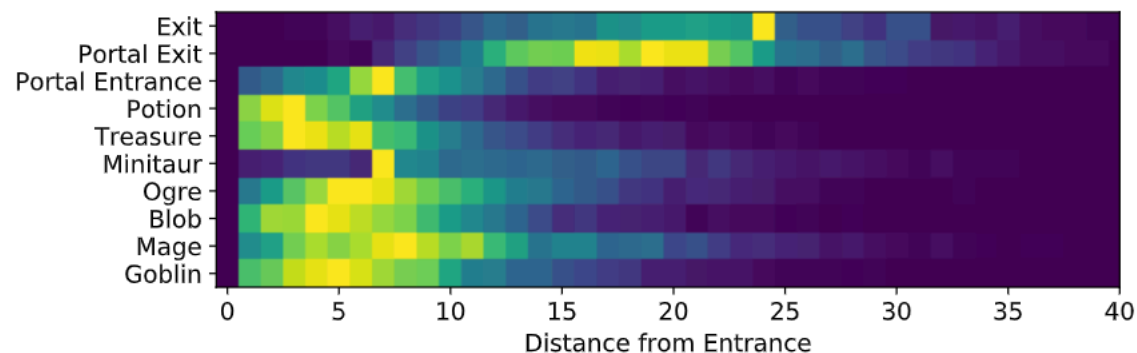
# Evaluation - Furnishing Analysis



(a) Constraint-based Furnisher



(b) CA Furnisher



(c) Agent-based Furnisher

# Evaluation – Playability

- 3 Personas\*
- 1000 levels for each creator-furnisher



Monster-Killer



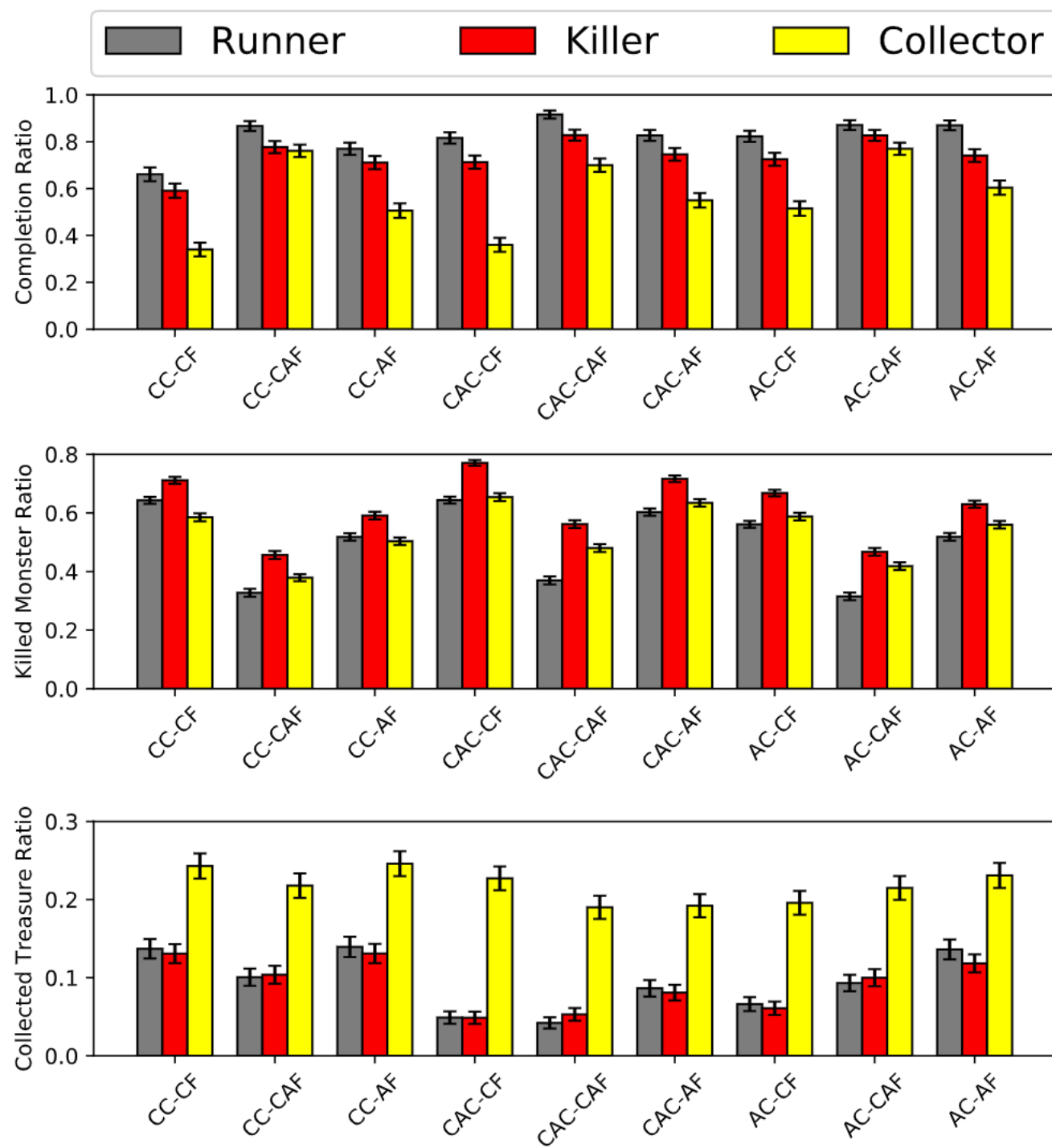
Runner



Treasure-Collector

\* Holmgard, Christoffer, et al. "Automated playtesting with procedural personas with evolved heuristics." *IEEE Transactions on Games* (2018).

## Playability Results



# Discussions

- Many different combos possible with potential for other generators!
- Different combos = different strategies
- Agent Furnisher only uses 1 step lookahead, what if more complex?