

Game 3 Paper Prototype

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Goals:

- Compare the economic output of towers to their cost of creation and upkeep. In essence, assuming that defensive towers protect economic towers at some proportional rate, what costs and outputs of the towers lead to a system without instant death or uncontrolled scaling of money.

Rules:

1. A trial starts with a set amount of gold in the player's bank and an amount of gold that each economic tower earns per turn.
2. Each turn, the towers will be attacked. Each tower has a chance of being destroyed.
3. If a tower survives, it generates its expected output (0 gold for defensive towers, or a fixed amount of gold for economic towers.)
4. If a tower dies, it does not generate any gold, and instead costs its initial creation cost to rebuild.
5. For the purposes of our tests, towers cost 20 gold to create, economic towers generate 5 gold per turn, and the chance that a tower is destroyed is $(1 / 2^n) * 100\%$ chance of being destroyed each round, where n is the number of defensive towers in place. (Thus, if only economic towers exist, there is a 100% chance they are destroyed. With one defensive tower, this is a 50% chance, with two, a 25% chance, etc.)

(Pictures attached at the end, I hate Word)

Trial #1:

- In this trial, the player began with 40 gold and used it to purchase one economic tower and one defense tower, leaving the player with a starting balance of 0 gold.

After one round, the defense tower had been destroyed, and the economic building had only generated 5 gold. As such, there was not enough money to rebuild the defense tower.

Thus, on the next turn, the economic building had a 100% chance to be destroyed and the player would lose.

Trial #2:

- In this trial, the player began with 60 gold and used it to purchase one economic tower and two defense towers, leaving the player with a starting balance of 0 gold.

After one round, the economic tower and one of the defense towers had been destroyed,

leaving the player with only one defense tower, no gold in the bank, and no way to generate gold. Thus, the player could not progress, and the remaining defense tower had a 50% chance to be destroyed each turn from then on.

Trial #3

- In this trial, the player began with 100 gold, and used it to purchase one economic tower and two defense towers, leaving them with a starting balance of 40 gold.

The player lost both defense towers in the first round, and gained 5 gold from their economic tower, leaving them with 5 gold after rebuilding. On the next turn, they lost a defense tower again, and while they gained 5 gold, they did not have enough to rebuild the tower. Thus, on the third turn, with only one defense tower, they lost their two remaining towers, without enough gold to rebuild any of them

Trial #4

- In this trial, the player began with 200 gold, and used it to purchase one economic tower and two defense towers, leaving them with a starting balance of 140 gold.

In this trial, the player survived 12 rounds, so the larger starting balance was much more effective for their long-term survival

Trial #5

- In this trial, the player began with 200 gold, and used it to purchase one economic tower and two defense towers, leaving them with a starting balance of 140 gold.

This player also chose, at turn 4, to spend 20 gold on a second economic tower.

This player also survived for 12 rounds, but the amount of gold they had remained much more static in the first 8 rounds, until bad luck with dice rolls caused them to lose in the final 4 rounds.

What did we learn:

- This set of tests was effective at showing us that a starting amount of extra gold is necessary for the player to survive the early game. This makes sense, as gold is analogous to “health” in this game as well as being a resource.

This test was also good at illustrating that buying extra economic towers will be a somewhat risky investment, but this should pay off and allow for the player to expand, which will be useful as more expensive towers are unlocked and stronger enemies appear.

Overall, this set of trials shows that the balance of economic and defense towers is good, as both are clearly necessary to win, and gives us good starting ranges for the ratios between numbers to use in the actual game.

Trial 4: Start: 200g (spend 60) game 5

Round	1	2	3	4	5	6	7	8	9	10	11	12
Econ	10	15	15	20	15	20	15	15	15	15	15	15
Def1	0	0	10	0	0	20	0	0	0	0	0	0
Def2	0	0	0	0	0	0	0	20	0	0	20	20

Gold 140 → 100

105 112

290 13

-40

45

50

55

20

33

13

40

-20

20

+5

25

30

-10

10

loss

Trial 5 continued

Col1	50	20	5	10
Row1	9	10	11	12
Def1	-20	0	-20	X
Def2	-20	0	0	0
Econ1	+5	+5	-20	X
Econ2	+5	-20	+5	X

No more econ
buildings, no change