

Astro-miner

Your job is to fly to an asteroid and mine all the available ore. Time is money - so you need to mine all the ore as quickly as possible.

- You start with a single robot
- A robot can mine one unit of ore in one day
- A robot can build another robot - but that takes two days
- With whatever robots you have, you decide whether each should be tasked with mining OR cloning on any given day
- Robots can't collaborate to reduce the time it takes to build another robot
- Having robots do nothing on some days is fine, provided you meet your quota in the shortest possible time.

The challenge

In the popular programming language of your choice, write code that calculates the shortest number of days to mine a given number of units of ore.

Examples:

- If there is 1 unit of ore, then having your robot mine for 1 day will complete the job, so the answer would be 1.
- If there are 6 units of ore, we could use days 1 and 2 building another robot, then both robots could mine two units each on days 3, 4, and 5 - so the answer would be 5 days
- If there are 11 units of ore, without building additional robots, the task would take 11 days to complete. If we spent days 1 and 2 building another robot, and days 3 and 4 having both robots build two more robots, then on days 5 and 6 we could have 3 robots mine a unit each while the other robot builds another robot, and on day 7 we can mine 5 units - so the answer would be 7 days.

Some numbers for testing with:

1 unit = 1 day

6 units = 5 days

11 units = 7 days

18 units = 9 days

74 units = 13 days

1,000,000 units = 40 days

We're looking for clean, readable code. Instructions on how to test your code might be helpful. Please be prepared to discuss the algorithmic efficiency of your solution.