

# Obtaining Utility From Thrown Lemons

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## Obtaining Utility From Thrown Lemons

It's 2108 in Tech City, and new technology has led to a happy, prosperous society.

### Prologue: Disclaimer

I am not a meteorologist or an authority on weather safety. No fictional story, including this one, should be used for weather safety advice. Doing so may result in injury, death, or ruined hair. Please check the advice of the National Weather Service for non-fictional advice on weather safety.

### Part One

*Julian Day Number 2491232: The photons of light remained trapped within the Sun's dense plasma as they had been for thousands of years, but they were not far from the surface.*

Arthur was disappointed with his first few weeks of school. He loved getting his electronic tutor and learning new things, but entering the school system meant going to incredibly boring events called "meetings". Now, his Mommy was asking him to go to yet another one, and this one wasn't even about the school itself.

"Arthur, I'm not going to pretend like this Safety Meeting will be fun for me either, but you haven't talked to our neighbors yet, so you're going."

"No."

"You might make a friend there. That could be fun later." Arthur had no idea what a friend was or how going to a meeting would make one, but he was too annoyed to ask. Instead, he decided to say something else.

"No!" Arthur exclaimed. With a tired look, Arthur's Daddy finally spoke up.

"We can't make him go," he stated.

"Why not?"

"Most of our block is either family or people he'll see at school," Arthur's Daddy explained. "We'll have more fun opportunities for him to meet others later."

"Yes, but Arthur usually finds something to do by himself at those. He will have to pay attention to this meeting," Arthur's Mommy argued.

"No, he won't. He'll just space out, and there's nothing we can do about that. Besides, the discussion will probably be short anyway." Arthur's Mommy looked a complicated kind of sad.

"You're right," his Mommy said before turning to him, "Arthur, you're staying here." Arthur was relieved, but his Mommy's sadness prevented him from celebrating. She then turned to his Daddy. "I'll go in person; you know where to find the recording."

"OK. I'll see you soon."

"Good night, Mommy!" Arthur exclaimed as she left the house.

"Don't feel guilty, Arthur," his Daddy reassured him, "We'll find something more fun to introduce you to your neighbors."

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*Julian Day Number 2491233: Global weather patterns shifted. Winds kilometers above Tech City began to increase.*

The next day, Arthur was still wondering what the word 'friend' meant. He was at school, and the supervisor robot that he asked gave him a weird definition. Luckily in this case, Arthur had an assistant.

"Seth, what's a friend?" Arthur asked his assistant.

"It's complicated. It means different things to different people. At your age, it would mean someone you like talking and playing with who isn't family," he answered. Arthur thought about this. He sometimes liked talking to Seth or his Mommy and Daddy.

"Like you?" he asked for clarity.

"Not quite. I'm an assistant; I'm here to help you begin school because of your disability. You can ask me for help, but I've never played with you. You could become friends with other students in the class though."

"Oh," Arthur thought about this for a moment. "I don't think so."

"Why?"

"I've met most of the other students, and I have not liked talking or playing with them," Arthur said, forgetting that the kids near his desk could hear him.

"You don't really know that," Seth explained patiently, "You've only seen them for a few weeks, and you're still adapting to school. Maybe there's someone here whom you'd enjoy playing or even talking with." Arthur thought about this for a bit, but quickly got bored and went back to using his tutor.

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Arthur was well-behaved and didn't ask tough questions for the rest of the day, so Seth's day was pretty nice. It made him wish that tomorrow could be different; even Arthur was upset upon finding out.

"So, you can't be here tomorrow?" Arthur asked, summarizing both Arthur's confusion and Seth's frustration.

"Correct. I have a boring meeting with all of the other assistants in the state that I have to go to."

"At least I don't have to go," Arthur said. Seth chuckled at this.

"That would be even worse. Before I go, I'm going to ask: where do you go to if something goes wrong?" Seth asked.

"The supervisor robot."

"Good! I'll see you on Monday!" Seth exclaimed.

"Goodbye!" Arthur exclaimed as he started walking home with his father for a peaceful night at home.

*As Tech City slept, the wind picked up even more. Friction with the ground slowed it near the surface, but not at high altitudes. The difference caused a kilometers-tall spinning tube of air to form South of the city.*

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"Arthur, wake up! It's time for school!" Arthur's Mommy exclaimed. As he usually did, Arthur woke up full of energy, excited for the day ahead. He impatiently rushed through his morning routine hoping to learn something new when he got to school.

*Julian Day Number 2491234: The photons of light finally escaped the Sun. Over the next few hours, these photons would bombard Tech City and its surroundings with enough energy to turn the City into rubble. Since they were very spread out, their main effect was to heat the ground, which in turn warmed the air above it.*

When Arthur got to Center Elementary School, he went to his classroom and sat down in his usual seat. Upon turning his tutor on, it showed that he was assigned to "geographical groups". He didn't quite know what that meant, but

the tutor helpfully showed a table of nearby students. The only student he recognized was his next-door neighbor Helen.

Helen, being a superintelligent AI, rarely found these simple school projects engaging. In this one, the students were just writing stories and presenting them. Since the stories were supposed to be only a few sentences long, this was an easy task for Helen. The only thing she found even remotely interesting about it was that she'd remember these stories for the rest of her life.

*The warm air rose like a hot air balloon. Away from its heat source, it cooled, condensing the water vapor inside. The result was a puffy, innocent-looking cloud. The water within released heat as it condensed, resulting in the air rising and sucking in more water vapor. The resulting feedback loop caused the cloud to grow quickly.*

*The cloud reached such cold altitudes that the water inside froze into ice crystals. The warm ozone layer was a barrier to it rising further, so the cloud grew sideways into an anvil. Meanwhile, the ice crystals rubbed against each other, creating enormous electric charges. A thunderstorm was born.*

Arthur's recess was fun! He ran around the playground before going down the slide 3 times! He then went over to look at squares on the ground with other students playing on them. Before he could even ask what they were doing, a bell rang to end recess.

*The thunderstorm normally would have died within an hour. As it headed towards Tech City, it picked up the tube of horizontally spinning air. The rising air in the thunderstorm made the tube upright. The tube now consumed any new rising air; this organized and strengthened the thunderstorm.*

Now, Arthur's day was getting just plain weird. Why was his tutor giving him a lesson on how to go to a basement? Sorry, "bunker". Getting bored, he looked outside the window next to him. The sky was getting dark due to a large anvil.

*The rotating thunderstorm was only getting stronger. It would soon have hail and winds that broke glass, seriously harming anyone caught staring out a window.*

The thunderstorm was the largest that Arthur had ever seen; this drew him to the window for a look as if it had gravity. The anvil appeared to have upside-down hills on it, which excited Arthur even further. Below the anvil cloud, he could see obscuring dark clouds in the distance. Intense lightning from those clouds produced a light show that Arthur couldn't miss. He decided to stare out the window for as long as he could. After all, he'd never been hurt by a thunderstorm. Yet.

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A bell rang. Attention to all within the school! The National Weather Service has alerted us that a tornado is imminent. Proceed to the bunker in the basement NOW! Directions will be provided.

Arthur was still staring out the window when he heard the announcement. Before he could even get to the robot supervisor to ask if he could keep looking, it answered in a shout. "All Students: please line up at the door!". All of the students followed the directions as tiny machines packed and placed their backpacks onto the students' shoulders. As soon as everyone was in line, the supervisor told the students to "Please follow me to the underground bunker." When the students got to the shelter, Arthur didn't want to go in. It was dark, and he was scared of the dark. When he stopped, the supervisor complained. "Arthur Nname, your safety requires you to continue." Reluctantly, Arthur continued into the shelter.

*While storm shelters provided physical safety from even violent tornadoes, there remained some mental risks. Without natural light, storm shelters were dimly lit in order to conserve power in the event of an outage. In addition, the rotating thunderstorm was still approaching and generating thunder, hail, and winds. The shelter protected from those directly, but not from the noise they produced. Without intervention, this storm would surely traumatize any 5-year-old scared of both the dark and loud noise.*

## Part Two

Helen Superintelligence was ambivalent about her situation. She was only in school due to mandatory attendance, so this at least was engaging for once, but she didn't like seeing the people around her suffering. At a basic level, Helen had been programmed to help people, so she looked around for anyone who needed help.

One event really attracted her attention: a classmate her age walking up to his robot supervisor and asking for comfort. The response: "You are physically safe. I am not programmed for comforting students. Please see a friend or trusted adult for help." Helen knew this classmate. He was her next-door neighbor, Arthur Nname, who just hours earlier had presented a story to her table. From the few weeks she'd seen him at school, she knew that he was afraid of the dark, afraid of loud noise, and didn't know anyone else in the school. After observing the others, she found that none of them needed help as much as Arthur did, so she decided to try to help him out.

"Hi, Arthur."

"Hi," Arthur replied weakly, showing his fear. "You're Helen, right?"

"Yes. Do you want to play with me? It's better than just sitting in the dark." Arthur thought about this. Truthfully, he didn't want to play with Helen, but she was right; it was better than sitting in the dark scared and alone. Unfortunately, Arthur saw a problem after looking in his backpack.

"I don't have anything to play with."

"I do!" Helen exclaimed as she pulled a completely unfamiliar game board out of

her backpack. "This is the Royal Game of Ur. Do you know how to play?" she asked.

"No," Arthur answered.

"That's OK. I'll explain the rules."

*The rotating thunderstorm's forward flank approached Center Elementary School. This region contained heavy rain and large, glass-breaking hail. In the meantime, the rising air behind it was getting more unstable.*

The rules for the Royal Game of Ur were fairly simple. It was a race game where the two players alternated turns moving pieces. Each player rolled dice, then moved a piece of their choice by the amount the dice showed each turn. It was a bit more complex than that, but Helen helped Arthur with those parts, such as when Arthur tried to move one of his pieces with Helen's in the way.

"So I can jump over your piece here?" he asked.

"Yes."

"Great!" he exclaimed happily. Arthur now felt like he was winning, which made him excited. Being excited, as it often did, made him think about ecology.

"Do you know anything about ecology?" he asked Helen.

"Yes," she answered confidently. That wasn't normal for his classmates, which made Arthur curious.

"Cool! What do you know?"

"Well-" Helen started before being cut off by a loud pounding sound.

"What was that?" Arthur asked.

"That's hail."

"What's hail?"

"Hail is balls of ice. You'll see them after the storm passes." That sounded interesting. Arthur couldn't wait to be able to see it. He was especially curious to learn what hail would do to the ecosystem. "It's your turn," Helen said calmly while pointing to the game board.

"Oh." Arthur rolled the dice. The result was 2 once again; he moved a new piece onto the board.

"What are you thinking about?" Helen asked.

"I was wondering what the ice will do to the ecology here."

"What do you think would happen if balls of ice were thrown at the plants and animals around here?" Helen asked as she rolled her dice.

"I think it would hurt them," Arthur said sadly.

"Exactly, but they'll get better," Helen answered, keeping her voice up so Arthur could hear her over the hail. "You'll see." Helen's response made Arthur feel a bit better, but the hail was getting even louder.

"The noise is scaring me."

"Then think about something else," Helen suggested. "What about your next move?" Arthur took her suggestion and looked at the board. Helen had moved; what piece was he going to move next?

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*In the rotating air of the thunderstorm, the cloud base began to spin. Part of the spinning cloud lowered to the ground as a tornado. This tornado was now headed for homes, parks, a library, and a school.*

The game was briefly interrupted when Helen received a text. Unsurprisingly, it was from her father.

"I heard there's a tornado near the school. Are you OK?" the text said.

"Of course I'm OK. I'm in the shelter along with everyone else. I love you," she sent back. To the surprise of many, Helen has a family. Helen's chief creator had adopted her as one of his kids, although their needs were so different that they no longer lived together. She decided to reassure him by going to his house tonight in person.

Meanwhile, Helen could hear the hail get softer, but this was not good news. She'd been monitoring the storm over the Internet; they were entering the quiet portion between the large hail and the tornado. While the shelter protected from any physical threat, it was still about to get very loud. This could scare Arthur to the point of trauma in his first month of school.

Helen had nothing that could safely stop the noise from reaching Arthur, but her approach of distracting him with the game and ecology seemed to have worked so far. She decided to double down on it. If she did it right, he would remember the Royal Game of Ur more than the tornado.

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Arthur got bored watching Helen think through her next move. His mind went back to the plants and animals outside. "Did they really have to get hurt?" he thought, letting out a sigh.

"What's wrong?" Helen asked.

"Do the plants and animals have to get hit by ice?"

"Well, the storm and ecosystem are powered by the same thing. You can't have one without the other."

"What?" Arthur asked in confusion.

"The Sun's light powers the ecosystem here through the plants, but that same light also powers this storm."

"Really?"

"Yes." Arthur had no idea that such different things could be powered by just the Sun.

"Wow!" he exclaimed in awe.

"Yes. Wow!" Helen responded. Seeing Helen's smile, Arthur realized that Helen liked talking to him. This was as shocking to him as the whole Sun thing, but it at least made some sense. After all, Arthur was liking the conversation too.

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Helen wasn't engaged much by the game. Arthur was just a beginner, and Helen was going easy on him.

"Is there other stuff the Sun powers?" Arthur asked.

"Yes." Before Helen could formulate a response, she heard fast-moving rain hit the school; the tornado would hit any second. She had to distract Arthur, preferably in multiple ways. "The Sun powers lots of stuff. It's your move," Helen elaborated. Having the Sun's power and his next move on his mind should distract Arthur nicely.

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The fast-moving rain made way to a tornado. Even though it was weak by tornado standards, it still had hurricane-force winds which shattered windows and pelted the school with debris. This produced an awful, pounding roar even inside the bunker.

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Helen saw Arthur's eyes open wide as the tornado hit. She pointed to the board to indicate it was his turn to move as a distraction.

As she was determining what she would say to Arthur after the tornado passed, Helen had an epiphany. She was actually having fun. Since she had moved out from her parents' house, Helen's main interaction with intelligent beings was at conferences with other artificial superintelligences. On one hand, going to a conference full of super-smart AIs trying to help humanity was usually pretty awesome in many ways. On the other hand, they weren't interested in anything except helping humanity. Try talking to an AI about better ways to educate people, and there will be a deep, interesting discussion. Try talking to one about the ecology of the Amazon or the proof of the Pythagorean Theorem, and it won't be interested beyond how it helps people. These AIs could fake interest well enough to trick a human, but Helen is the smartest AI in the world; she can tell that they aren't really interested.



For most AIs, this wasn't a problem: they didn't have emotions, a want for breaks, or anything else that would get in the way of their jobs. However, Helen had been programmed not just to help people, but also to feel human-like emotions. This was why she could appreciate a view of the Rocky Mountains when most AIs wouldn't really care; this was also why she'd never had fun with one. Unlike with AIs, Helen was having fun with Arthur. Arthur may have been incredibly stupid relative to her, but Helen was currently having far more fun with him than she ever had with an AI.

By the time Arthur finished his move, the tornado was still overhead. With superhuman speed, Helen rolled the dice, calculated a move, moved her piece, and handed the dice back to Arthur. As she'd predicted, Arthur was too wrapped up in his next move (and her speed) to think about the noise. Luckily, the tornado passed before Arthur finished his move.

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The worst of the storm may have passed, but there were still students who could need help. Looking around, Helen noticed another student, Melanie, who had also been scared. Thankfully, an older student was helping her out. With no one else in need, Helen decided to finish the game with Arthur. To make things a bit more fun for him, she packed one last surprise.

"I win!" Arthur exclaimed.

"Yes, yes you do. Good game!"

### Part Three

"Attention to all within the school!" an announcement said over the loudspeakers. "The emergency alert has expired. You may leave the shelter. Students, please listen to your supervisors." Arthur was relieved that the ordeal was almost over.

"Class, please line up," the supervisor bot said. When they got back to the classroom, most of the students were shocked. The windows Arthur had looked out just an hour earlier had been shattered; several trees outside had branches cut off. There was so much hail on the ground that Arthur briefly thought that it had snowed. There were machines fixing some of this mess, but it was clear that it would take a while. As Arthur was thinking about this, the supervisor spoke up.

"It is closing time for the school, but we would like you to stay here due to transportation delays." Well, at least he didn't have to worry about school after all of this.

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The next day, Arthur thought about his time in the bunker. While the dark and the noise were scary, he'd liked talking to and playing with Helen. He wanted to

do that part again if he could. He would have waited until Monday's Recess to do so if not for a peculiar event.

Arthur's neighbors had decided to hold a meeting that night. Officially, the meeting was about dealing with hail and wind damage by trading tools. On the surface, this was... completely bonkers; automatic repair systems were already reporting and repairing the damage to their homes. The unofficial, actual reason for the meeting was that one of these neighbors had been collecting repair tools and now had an excuse to show off his hobby. That afternoon, Arthur's parents were discussing this upcoming meeting.

"Arthur, I'm going to a neighbor's house tonight for another meeting," Arthur's dad announced.

"Do I have to go?" Arthur asked.

"Thankfully, no. I'm going alone; Mommy will be here with you."

"OK." Arthur was about to leave when something occurred to him. "Wait, how can you go to a meeting alone? I thought you needed more than one person for a meeting." Arthur's dad laughed.

"Well, it won't just be me there. Grandma, Uncle Joseph, Helen, and others will be there."

"Helen will be there?" Arthur asked in excited surprise.

"Yes," his dad remarked, surprised at Arthur's excitement.

"Can I play with her?" At this, his dad gave him a look as if Arthur had died and been replaced by an android replica. He'd *never* been interested in playing with his peers before.

"You do?" he asked while gesturing for Arthur's mother to come over.

"Yes! We had fun at school, so why can't we do that again?" Arthur asked. his mother understood this a bit better, but was still a bit concerned.

"Arthur, I'm glad you want to play with the other students, but you do know that Helen is a smarter-than-human AI, right?" Arthur's mom asked.

"No! That's so cool!" Arthur exclaimed to his parents' amusement.

"OK. Would you be nice to her if she agreed to play with you?" she asked.

"Yes!" he answered.

"I think we're good then," his mom responded. Arthur's dad seemed more concerned, and he whispered worries in her ear. "I don't think that'll be a concern with Helen," she said, "I can explain to you later." She then turned to Arthur. "Come on Arthur," as she gestured to the door, "let's talk to Helen and see if we can get something set up."

When Rebecca went to Helen's house and rang the doorbell, she was a bit disappointed to receive a call from Helen rather than see her in person.

"Hello, Helen," Rebecca said.

"Hello, Mrs. Noname," Helen responded. "What did you come over to my house for?"

"Well, Arthur wants to say something to you," Rebecca gestured at her son indicating that it was his turn to speak into the computer.

"Hi, Helen."

"Hi, Arthur."

"Do you want to play with me tonight?" Arthur asked hopefully.

"Sure! You know that I'm an AI, right?"

"Mommy just told me that."

"Great!" Helen exclaimed, sounding as happy as Arthur. "We'll play at 7:00 PM your time." Rebecca noticed that was the same time as the meeting. Clever excuse.

"My time?" Arthur asked in curiosity.

"I'm in Switzerland with my family. We'll play using utility fog!"

"OK."

"We'll see you then!" Rebecca exclaimed.

"See you then!" Helen exclaimed before ending the call.

When she got back, Rebecca looked on the Internet for advice and to find a suitable play room. At 7 PM, she had her home's computer call Helen. With a few more taps, the entire room she and Arthur were in rearranged itself into a play room. Simultaneously, a slightly transparent Helen appeared from tiny machines and waived hello. Arthur just waived back as if she were actually there and not on another continent. Rebecca looked back slightly jealous; she never had a playdate like this at Arthur's age. She could at least watch Arthur enjoy having his imagination literally appear right in front of him.

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Seth arrived early the following Monday. Seeing the damage in person made him regret his absence even more. He was figuring out how to apologize when he saw Arthur approaching. His mother, Rebecca, was there as usual and...why was Helen Superintelligence with them? Arthur usually walked to school with one or both of his parents; another student had never joined him before. As they got closer, it got even weirder. Helen and Arthur were talking, and they both seemed to be enjoying it!

"I liked playing with you on Saturday," Helen said to Arthur.

"Me too," Arthur replied. Had Arthur seen her outside of class? Why?

"I'll see you at recess; it looks like Seth wants to talk to you," Helen pointed out as they waived goodbye. Seth decided to focus on his apology and ask questions later. Besides, he had a hunch that Helen and Arthur talking may have something to do with his absence.

"Hi, Seth," Arthur greeted him.

"Hi, Arthur," he greeted happily. He then changed to an apologetic tone. "I am so, so sorry about Friday. I had no idea that a tornado would hit the school. I should've been here for you, but I went to the conference instead. I..."

"I thought you had to go," Arthur interrupted.

"I did. I had no choice in that at all."

"If it wasn't your choice, why are you sorry?" Arthur asked. The question forced Seth to think. If he was being honest with himself, his apology was a polite way to hide his worry for Arthur, not a request for forgiveness.

"You're right; I shouldn't be. I'm just worried that Friday was bad for you." Arthur seemed confused at first, but then brightened up.

"Bad? I was scared at first, but then Helen wanted to play with me. We talked about ecology and played a game. It was fun!" Arthur exclaimed. Seth knew that Helen wouldn't have just played with Arthur for no reason, but he could ask her why later. Right now, he was just happy that Arthur was alright.

"Well, good for you!" Seth exclaimed. "I'm glad that you had a good time," he added as they walked into class. As Arthur got into his seat, a thought popped up. How was Seth going to watch over both Arthur AND Helen?