

# Pinocchio

# Exercisebook

*Follow Pinocchio on his marvelous adventures*



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*Based on works by Carlo Collodi*

*With illustrations from Enrico Mazzanti, Carlo Chiostri  
and Sydney Padua*

*Inspired by the motion picture "Guillermo del Toro's Pinocchio"*

*The stories and exercises in this book play in the so-called Pinocchioverse, a fictional universe, which was created for teaching computer science dynamically through different forms of media. The adaptation for stories is only one possibility of this. More information and the documentation can be found here: <https://pinocchioverse.org/documentation/>.*

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***Disclaimer: This is a private project that was crafted without any didactical expertise and should not be used for actual teaching. It should rather be seen as a first prototype that could be expanded in the future for practical application.***

## Prologue

*Once upon a time, in a small village, there lived a woodcarver named Geppetto. He was very sad because he was all alone and didn't have a son to share his life with. One day, while he was sitting outside his workshop, he looked up at the night sky and saw a shooting star. He made a wish that he could have a son to share his life with.*

*Suddenly, the light of the star went brighter and brighter and Geppetto had to look away. He then heard a loud crash in the nearby forest. He ran to see what had happened and found a beautiful marble that had fallen from the sky. The marble was made of a special kind of ore that Geppetto had never seen before. He knew this was a sign from the stars that his wish had come true.*

*Geppetto decided to use this special ore to make a special marionette. He carved a wooden figure and placed the marble inside, along with special tracks to make the figure move.*



*And so, Pinocchio was born!*



*Pinocchio was like no other marionette Geppetto had ever seen. With the special ore and the marble tracks inside, he was able to move and play just like a real boy. Geppetto and Pinocchio had so much fun together, and soon the whole village came to see the amazing marionette.*



*Everyone was so impressed with Pinocchio that they asked Geppetto to make apparatuses for them, too. Geppetto was happy to teach the villagers how to use the special ore and to help them in their daily tasks.*

# Day 1: The Forest (Basic marble track components)



*Today, Pinocchio wants to spend some time in the forest*

*“But before you go into the forest, you need to learn some new things, won’t you? What would be the use of going into the forest without new ideas?”*

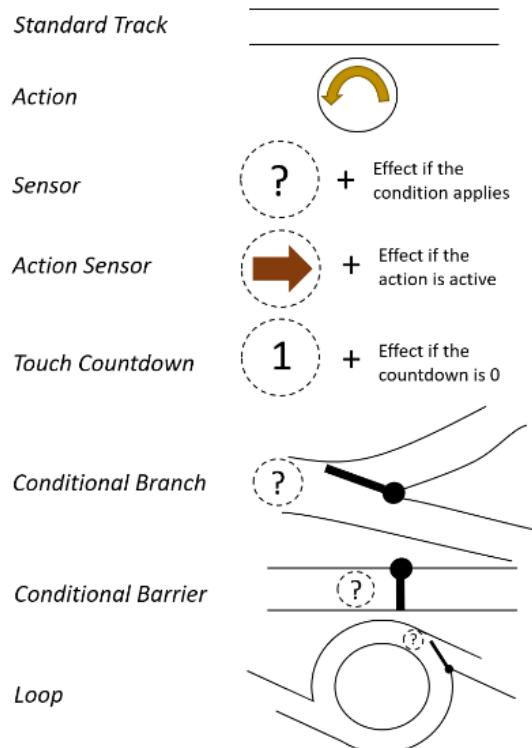
*And Pinocchio couldn’t agree more on that.*

*So together, they went into Geppetto’s workshop.*



Here, Geppetto showed Pinocchio how marble tracks work.

"Look here, Pinocchio", he said, "there exist these basic track pieces to build marble tracks and the following seals that can be pasted on the track to trigger certain actions." And he laid them all out in front of Pinocchio and explained them to him one after the other.



Afterwards, Pinocchio nodded happily and went his way.

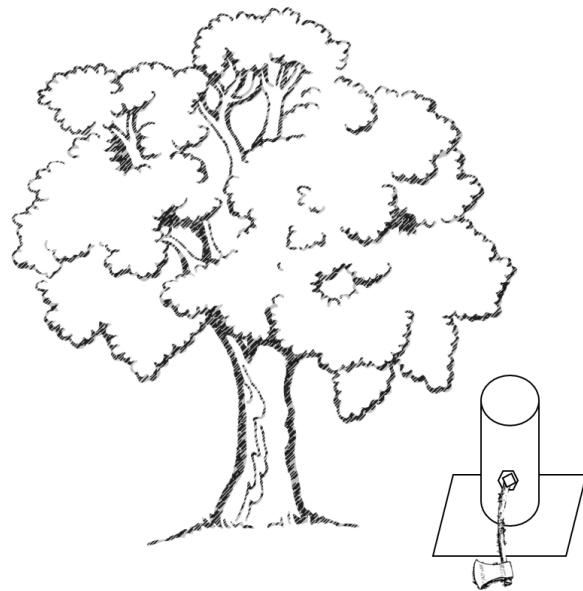
## Exercise 1: The Woodcutter

*So, Pinocchio went into the forest.*

*There he met a woodcutter, who was working on a particular large tree.*

*Pinocchio asked if he could help him and the man laughed. How should such a tiny little fellow be of any help, when even a strong man like him couldn't cut down the tree?*

*Pinocchio thought about this for a while and then said: „I think if an idea“ and with that, he want to his father's study and build something ... if he only knew how the marble track for the machine should look like ...*



Available actions:

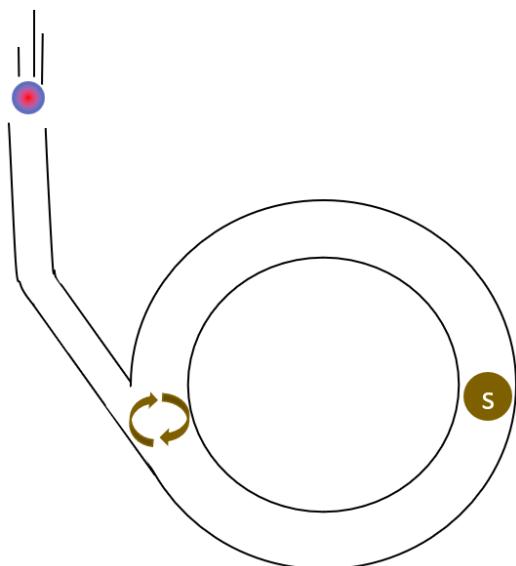


Rotate



Back To Start-Position

*Solution:*



*The woodcutter thanked him and Pinocchio went away.*

## Exercise 1: The Wandering Merchant

*After a while, Pinocchio saw a wandering merchant on a horse. She was carrying a big wagon of hay.*

*When she saw him, she raised her hands in greeting. She had already heard of the wooden puppet.*

*“Can I help you?”*

*“I don’t know. You see all the hay that I lose?”*

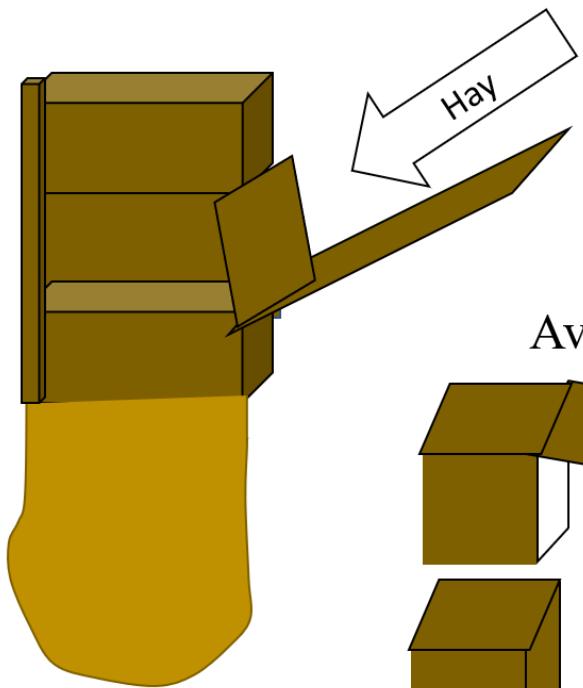
*“Yes?”*

*“You could help me stuff the hay in sacks so I wouldn’t lose so much of it. Could you do that?”*

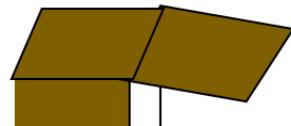
*“Mmh”, said Pinocchio and thought for a while about that. “Yeah”, he said, “I think I knew a way ...”*



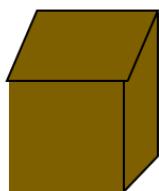
*And he went into his father’s study and really, he found an old apparatus, which could help out the woman. The woman, who had followed him, was amazed at all the great apparatuses in Geppetto’s study and she asked him, if she could copy some of the construction plans for her little farm and Pinocchio said: “yes, sure. Draw as much as you want.” And she smiled to herself, which Pinocchio didn’t understand.*



Available actions:



Open lid



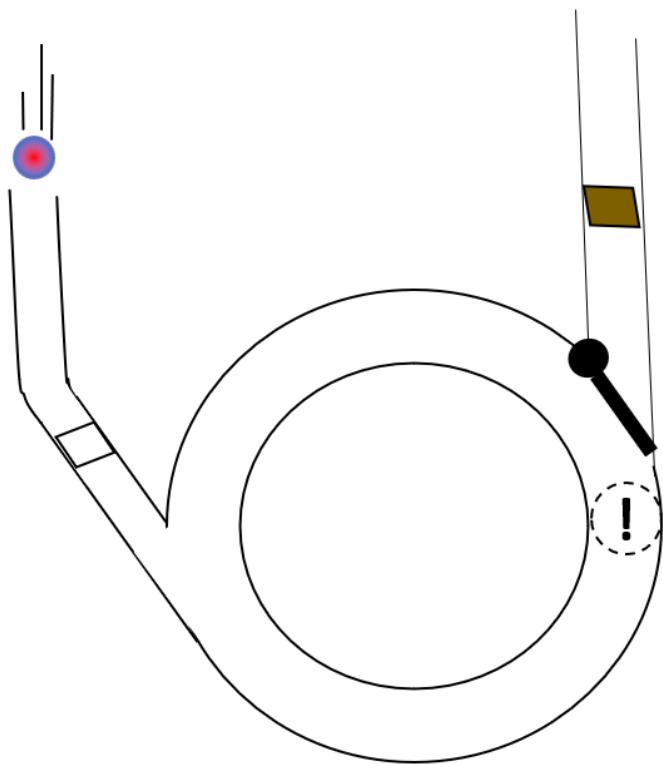
Close lid

Available sensors:



Sack full

*Then, the two carried it back in the forest, but as they tried to make it work, unfortunately, the marble track inside of it was broken. How could they construct a marble track so that the sacks are stuffed with hay but only until they are full?*



*The woman thanked Pinocchio heartily, and Pinocchio told her that she could come back any time she wants and the woman answered that she would happily do that.*

*Then, Pinocchio nodded to himself and was amazed how much good he had done in only one day. Then he went straight into the woods. He wanted to see after his friends, the fox family, which lived in the nearby forest.*

## Exercise 3: The Girl from the Treetops

*But as he approached the spot, where he had last seen the fox's family, he wasn't the only one there. A small girl, which he had never seen before, sat there and in the close distant, he saw ... the wounded fox. Her leg was injured and she wined.*



*(<https://freesvg.org/girl-in-the-forest>)*

*“I want to help”, said Pinocchio and stepped forward.*

*The girl didn't even turn around. She must have already heard him.*

*“Well, come here and help me mash this potion to make her legs well again.”*

*“No, I mean ... I want to build something ...”*

*Now, she gave him a quick glance.*

*“Build what?”*

*Pinocchio thought about that for a while. He thought and thought, but a good idea just wouldn't come. Then, he just went to the girl and helped here with the potion.*

*Afterwards, they washed their hands in the river. Pinocchio could feel nothing, but he was almost certain that it would be very cold, but he was too shy to ask the girl if that was true.*

“Who are you?”, asked Pinocchio instead. To that the girl only shrugged with her shoulders.

“I live here. I need no name.”

“What do you mean you live here?”

“Well, right here. Or more like: above us. In the treetops.”

“Oh ok.” He didn’t know that one could even do that and he told himself to think about that later for a little longer. But then, he decided to ask her right away: “Why do you do it?”

“What do you mean?”

“Why don’t you have a house? Animals or a workshop like my dad?”

“What for? I have everything I need here?”

“But ...” said Pinocchio and tried to search for a good answer, but he could think of none.

Then the girl grabbed his hand.

“Come on, I will show you something.”

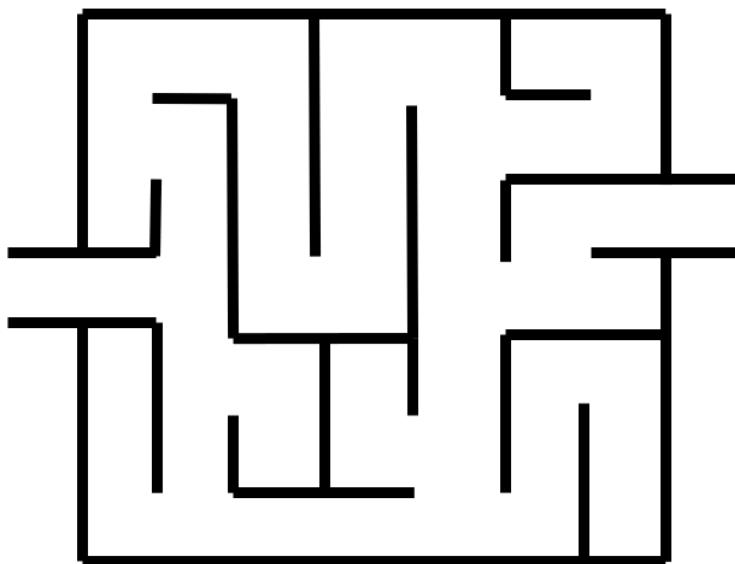
She climbed up the tree and she was as fast as a squirrel, Pinocchio had difficulty keeping on. Then they were above the treetops and could look all the way to the local village. He had never seen the forest like that before and as he looked in the other direction, he saw a giant castle.

“Wow”, said Pinocchio, “maybe some day I also want to live above the treetops. You can see everything from here.”

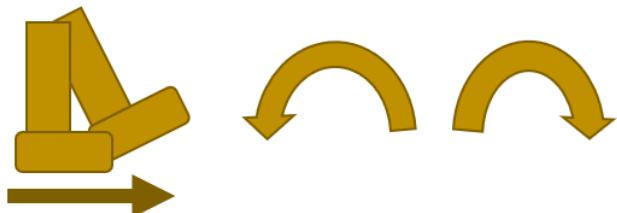
He thought he heard a laugh after that. But as he turned around the girl was gone and when he stuck his head back into the trees, she was gone altogether without any trace left.

## Exercise 4: The Hay Maze

*He made his way through the country to reach the castle he had seen on top of the trees, as suddenly, Pinocchio found himself before a big hay maze, which he did not know any way through.*



Available commands:



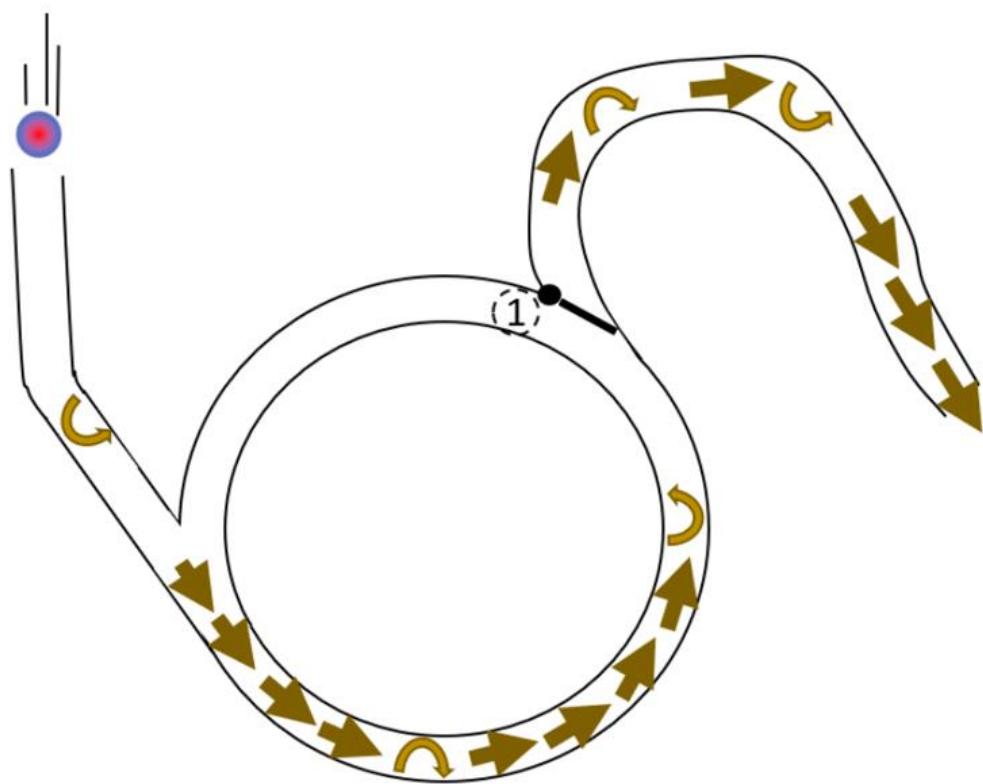
*„Oh, this must have been the last customer of the merchant lady! But how can I possibly come through it?“*

*He saw no other people; the place was completely abandoned. Possibly as part of the carnival, that was supposed to happen here next week. But now, he still had to get through it.*

*He so much wanted to reach that other part of the forest, where his other friends, the batcher family lived. But he could think of none ..*

*- Can you create a marble track to control Pinocchio 's movements and help him through the maze?*

*Solution:*



*Suddenly Pinocchio had an idea and he build the marble track, ate the marble and without an error, made his way through the maze.*

*And after that, as it was slowly getting dark, Pinocchio made his way back to his father's house. He would see what the castle was about on another day.*

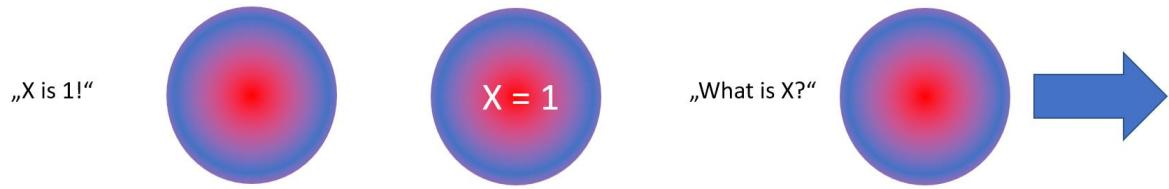
## Day 2: At the local village (Saving and accessing values inside of marbles)



*On the next day, Pinocchio wanted to visit the nearby village and help the people there. "But wait", he said, "if you want to go there, you also need to learn a few new things. The apparatuses that the people in the village need, are more complicated, because they often require to react to some form of input. Look ..."*

*And he showed him a simple device, with which to do calculations. And then he went on how one can save values inside of marbles and by that, make an apparatus react to certain input values."*

*And he showed him all the different ways to save values in marbles and access them in marble tracks. As it comes out, marbles can also save values inside them, attached to symbols. There can operations be run on these values and values of symbols can be extracted from the marbles. These special symbol combinations are also called "complex symbols".*



*Then Geppetto nodded and said happily: "Now you are ready."*

## Exercise 5: Lord Gatto

*As he went through the city, he was approached by a tall man, who wore only dark clothes.*

*“Ah, you. I have already heard of you and your dad’s inventions.”*

*“Me? Pinocchio?”*

*“Yes, you. So ... little wooden man, do you want to help me, Lord Gatto, to make our little village ... nicer.”*

*„What do you mean ... nicer?“*

*„I just want a little more order in this city. Nothing wrong with a little order, isn’t it?“*

*„Well, maybe, but ... sometimes I don’t make order in my room, and my fathers workshop is also kind of messy ...“*

*„Wrong answer!“ And he took his nose and squeezed it that it hurt.*

*„So, is order good?“*

*And Pinocchio nodded fiercely.*

*„S-sure. Order, yeah. I love order!“*

*And so, Pinocchio went with him and because all the people he went by smiled, he also tried to smile.*



*After a while they came to the village's gate.*

*"Here", said Lord Gatto, "the until scoundrels go through this every day and don't go to school. I want you to build an apparatus, that closes the gate at night and during school hours. Understood?"*



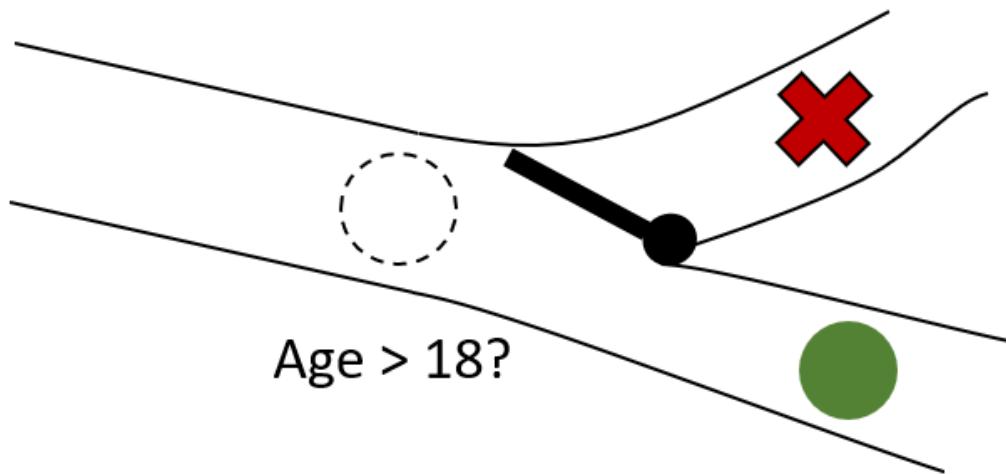
**Actions:**

**Close** 

**Open** 

*Pinocchio nodded gloomily. But he had already an idea ...*

*Solution:*



*“Great”, said Lord Gatto, “now no one can skip school. But how do we make sure that you can’t cheat? You know how young folks are. You could write anything on these marbles!”*

*“No, no, no, Mr. Gatto”, said Pinocchio and almost laughed, “everybody has a specific marble with their current age.”*

*And with that, the Lord’s eyes became big. “Yes, yes”, he murmured, “that could work.”*

*And before he could ask Pinocchio for anything more, he slipped out of the gate and ran back to another part of the village. The market, where a lot was going on. His favourite place in the village.*

## Exercise 5: The Farmer

*There, he met a farmer, how was arranging his goods on the market table in front of him. Pinocchio went straight to him, because he knew him.*

*“Hello Gob.”*

*“Good day, Pinocchio. How are you?”*

*“I’m fine, thanks”, said Pinocchio and held his nose, which was still hurting, “how are you?”*

*“I’m also fine, but I have all these goods with these prices on them and I want to order them real quick, but I don’t know numbers. Usually, my dad does all the numbering. Can you order them for me?”*

*“Sure. But I know something even better! Maybe I could build you something that could always order your stuff! What do you think?”*

*He thought about that for a while. “I think that could be very useful for me.”*

*“You would only have to scratch the prices of the food into the marbles and then let it run through the machine and follow its instructions.”*



Price per item	40	15	18	30
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Place on table	1	2	3	4
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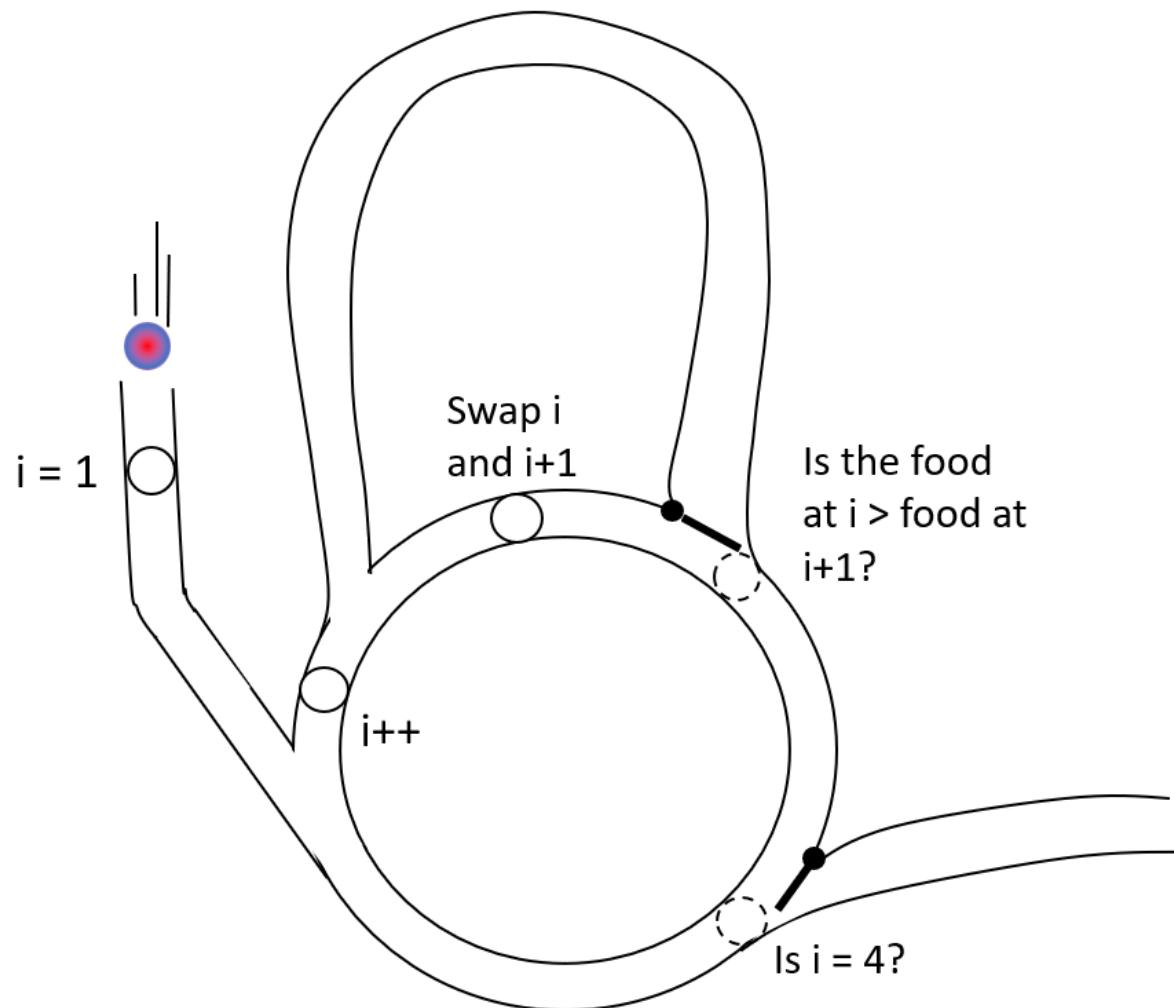
Available Actions:



*“Sure that would be alright.”*

*And Pinocchio went back to his fathers study and crafted something. If he only would knew how to build the marble track inside of it ... (its not necessary for the machine to solve it in one go. It would be sufficient if one had to insert the marble multiple times.)*

*Solution:*



*"You have to insert the marble four times. But then its working, see?"*

*"Wow, thank you, Pinocchio", said Gob and Pinocchio happily went his way.*

## Day 3: Ada's sneezing Castle (mechanical marble components and ethical problems)



<https://hoydenabouttown.com/2009/08/22/belated-friday-hoyden-ada-lovelace/>

*On the next day, Pinocchio remembered the castle that he had seen from on top of the trees and he asked his father, who lived there.*

*“That’s the young lady Ada. She is an engineer. She creates apparatuses for years without marbles but I haven’t paid here a visit, yet. Maybe you could just as well do that. Send her my greetings.”*

*“I will, Papa!”*

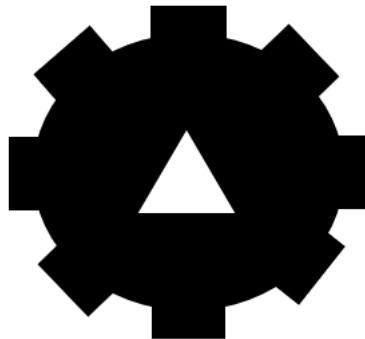
*And Pinocchio was already out of the door. Pinocchio reluctantly came back into the room.*

*“Hey, Pinocchio! Before you go, I have to show you something. Ada has a lot of great apparatuses up there and maybe she wants to show you some of them. You do want to understand how they work in principle, right? Then you could also explain here what it would mean to combine here ideas with marbles ...”*

*“Mmh ... sure!”*

*“Then listen to this: I created the following mechanical components to build apparatuses based on marbles:”*

**Gear wheel**



**Touch-  
Buttons**



*In high spirits, Pinocchio left the house and wandered vaguely in the direction he thought the castle would be as he heard he very loud sneeze in the far distant. He followed the noise and came to a giant, mechanical powered castle. People here apparently already knew of the power of marbles. He was excited was they had done with it and went inside, if only he knew where the giant sneezing had come from ...*

## Exercise 6: Ada's remote

*The doors of the castle were wide open when Pinocchio approached the castle. Inside, he could hear Ada swear from afar and he tried to remember all of the words to tell them his friends later.*

*Ada was inside the wall of the castle, which actually was a whole big apparatus and the walls consisted of mechanical components altogether.*

*“H-Hello?”, said Pinocchio as another salve of curses flew above him.*

*“Yes?”*

*“I’m Pinocchio, Geppetto’s son.”*

*The woman climbed out of the mechanical things that layered the wall and greeted him with a handshake. “Hi Pinocchio. I’m sorry. My castle has cached a cold … the gears are running wild. Nothing is working.”*

*“Can I help?”*

*There, Ada laughed.*

*“No, you can’t. It’s my fault. I build that error in myself. It will take days or weeks to find it … I need to activate several machines at the same time, which is incredible difficult for one person, and no one knows this machine as good as me. I would need at least two other me’s and these are really very hard to find …”*

*“Would it help if you had a remote controller to activate the machines?”*

*She looked at him, while cleaning her dirty fingers at a handkerchief on the wall.*

*“That’s impossible.”*

*“With marbles it is.”*

*“Marbles?”*

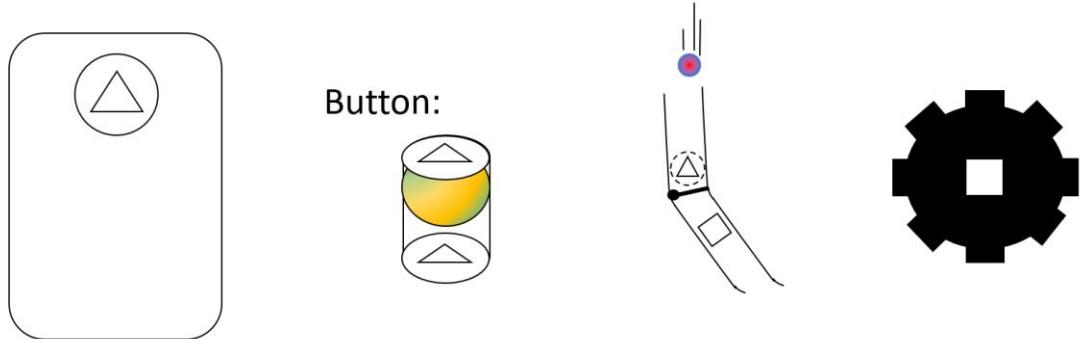
*“How do you believe Geppetto made me?”*

*And Pinocchio showed her some marbles and she made big eyes.*

*“I cannot believe this, where … and with this we can remotely control my machine?”*

*“I think we can … wait a minute.”*

*He brought a bag and to the amazement of Ada, he now began to stick things together and began to craft something.*



*Ada couldn't believe her eyes.*

*And Pinocchio showed her all the other mechanics that he and Gepetto had crafted based on marbles, and Ada was amazed. „Wow!“, she said, „what amazing things we could create with this! Thank you, Pinocchio!“*

„You’re welcome“ said Pinocchio and added: “I hope you can now find out why your castle sneezes.

*She nodded and stumbled against the wall. She had to sit down for a minute.*

*“The possibilities”, she said again and again. And Pinocchio decided to leave her in her shock to herself and digest, what she had seen.*



<https://www.theguardian.com/books/2016/aug/16/thrilling-adventures-lovelace-babbage-nicholas-lezard>

## Exercise 7: A short visit at the village

*And Pinocchio thought to pay a little visit to the village and see, how the people had used his machines for good.*

*But as he approached the gates, he found a whole other picture of the village he knew.*

*He gates were shut, no one would open them. He climbed above the wall, which was not very high. Inside, Lord Gatto was standing on the market square, declaring that everybody had to get a marble, on which his birth and names will be permanently saved and that, food in the city will be ordered and the best will be given to him and his family.*

*Pinocchio was shocked.*

*He thought: „Oh no, he used all the machines for himself. The gate is kept should only for him and his minions. The food machine he modified in a way that he always gets something out of it and he is using the marbles that identify people to always have an on them and putting people into prison he doesn't like! What has become out of my village?“*



*But before he could think about what to do, two hands grabbed him from behind. They were also out of wood. Out of the shadows, another figure appeared. It was a wooden guard, with the face of a dog. Apparently, Lord Gatto had build his own wooden puppets as a private police. But Pinocchio couldn't do or say anything. They took Pinocchio and without saying a word, threw him out of the village.*

*Questions: what went wrong here?*

## Exercise 8: Back at Ada's

*Pinocchio stumbled back to Ada's Castle, in which he found another visitor.*

*"Oh, that's Karle, my long-time studying friend. Karle, that's Pinocchio."*

*"Hi!", said Karle.*

*"So, Pinocchio, what's the matter. You look completely out of breath?"*

*Pinocchio had almost lost his breath and how it only bursted out of him: „Ada!“, he said, "Lord Gatto is using the machines only for himself. How can we stop him?*

*Ada and Karel were shocked*



<https://www.goodreads.com/book/show/22822839-the-thrilling-adventures-of-lovelace-and-babbage>

*But together, they came up with a plan to stop Count Gatto.*

*They run into the city and collected all the marbles and threw them in the nearby lake*

*With that, Lord Gatto had no power anymore of the villagers and they kicked him out of the village*

*And then, they all threw a big fest and everything was good again.*

*And Pinocchio went to his new friends Ada and Charles and said to them: „I wish we could make a quick painting of us sitting here. Wouldn't that be grand?“*

*And the two looked at each other, jumped off their seats and left.*

*And so, in the middle of the party, when the food wasn't even served, Ada and Karel ran back to their castle without saying a word. „How odd but also so very charming humans are“, Pinocchio thought to himself and after a while, went his way back to his father's house.*



<http://www.thingsmeanalot.com/2015/10/the-thrilling-adventures-of-lovelace.html>

*And Pinocchio told his Father of all the great adventures he had experienced on this day and what he had all learned and Gepetto, a little bit shocked but also glad, gave him a big hug and asked him, what he had learned from his adventure with Ada and Karle.*

# Epilogue

*In the following years, Geppetto, Pinocchio, and the villagers had many adventures and helped each other to make their lives better. And every time Pinocchio moved, the marble tracks inside him would make a special tinkling sound that reminded everyone of their friendship and the love they shared.*



*Pinocchio and Geppetto lived happily ever after, always grateful for the magical star and the marble that it brought from the sky, bringing them together as father and son.*



The  
End