



# Artificial Intelligence

Hadas Raviv, PhD

I come out of the cocoon naked. The chrysalis is lying there empty. My family and the doctors and the nurses all gasp and say, "You're beautiful".

I am, of course. The transformation is complete. I am beautiful. I have perfect golden eyes, six arms, and wings like butterfly wings, iridescent and blue. I am slim and tall. I am an angel.

I say, "What happened to the chrysalis?"

They say, "You ate it".

I say, "What?"

They say, "You ate it. The moment you were born. It's the first thing you did".

"I'm supposed to eat it?"

"Well, you wouldn't want to leave it lying around. People could trip over it."

"But I'm an angel."

"Yes, dear, you're an angel. But you've been through a lot. You're probably hungry."

"I am. I am so hungry."

They bring me platters of bacon and ham and turkey and roast beef and chicken and fish.

"No," I say. "This is all wrong."

"What?" they say.

"It's all wrong," I say. "The chicken's bones aren't right."

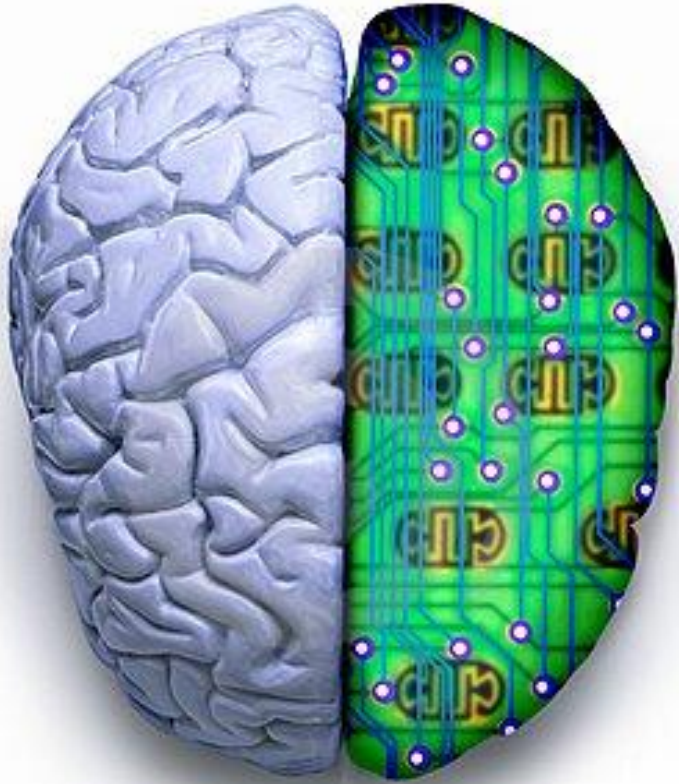
"What do you mean?"

"They're all the wrong shape. And the fish are all the wrong color. And look at this turkey! It's a turkey. Turkeys aren't blue. And look at this ham! Ham isn't green. Where's the beef?"

"There isn't any beef," they say.

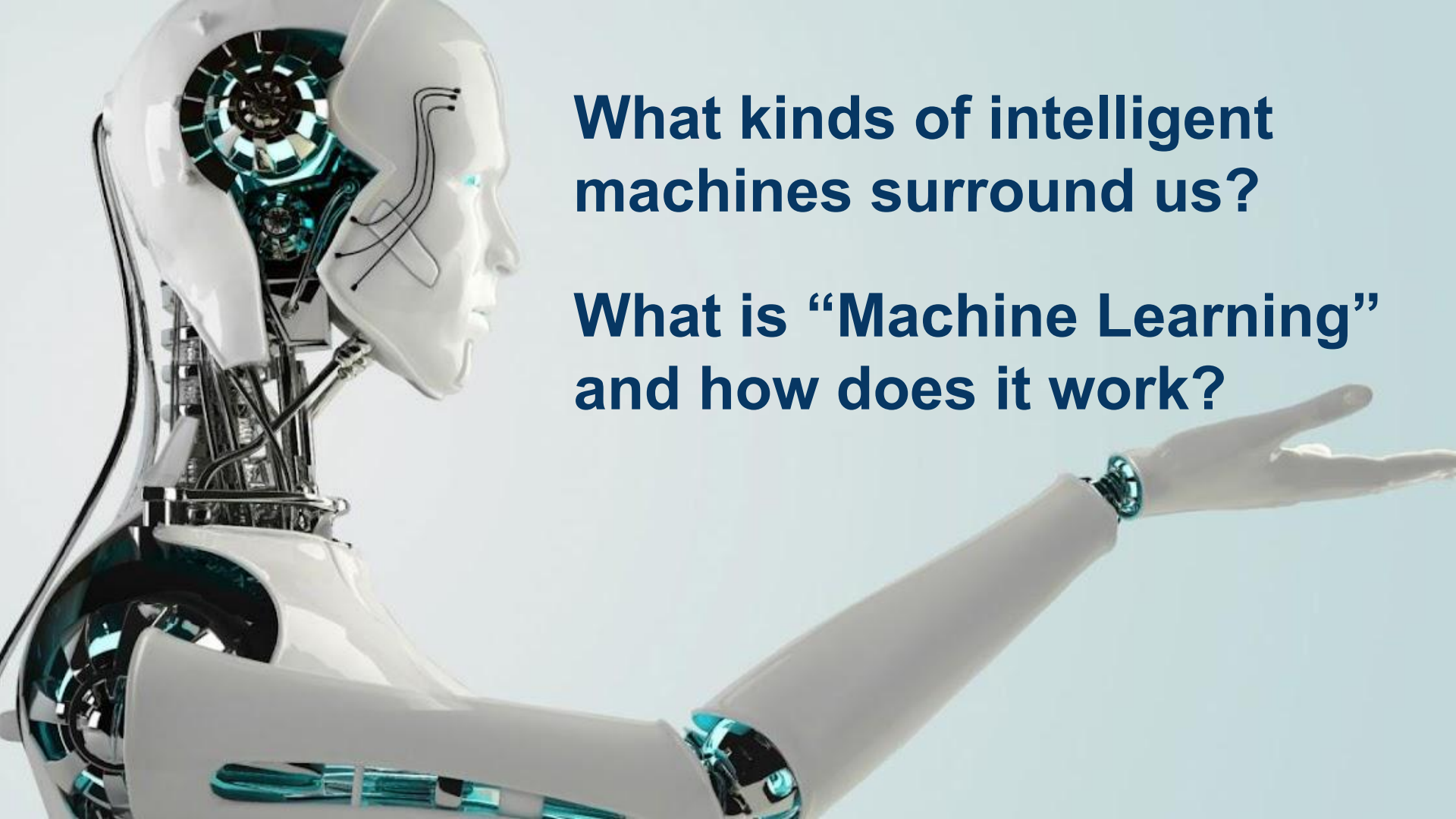
"There isn't?" I say.

"No, dear. There isn't."



# Intelligence?





**What kinds of intelligent machines surround us?**

**What is “Machine Learning” and how does it work?**

# What kinds of intelligent machines surround us?

```
ret 337
} 338
return ret 339
}, 340
function arg:fu 341
function r 342
var l = fn. 343
if ( 344
var args = 345
return 346
}, 347
key:quote, //ob 348
functionCode: [ 349
attribute:quote 350
quote, 351
352
353
354
```



hour of



hour of **code**

hour of **code israel**

hour of **code code.org**

hour of **code minecraft**

hour of **code angry birds**

hour of **the witch**

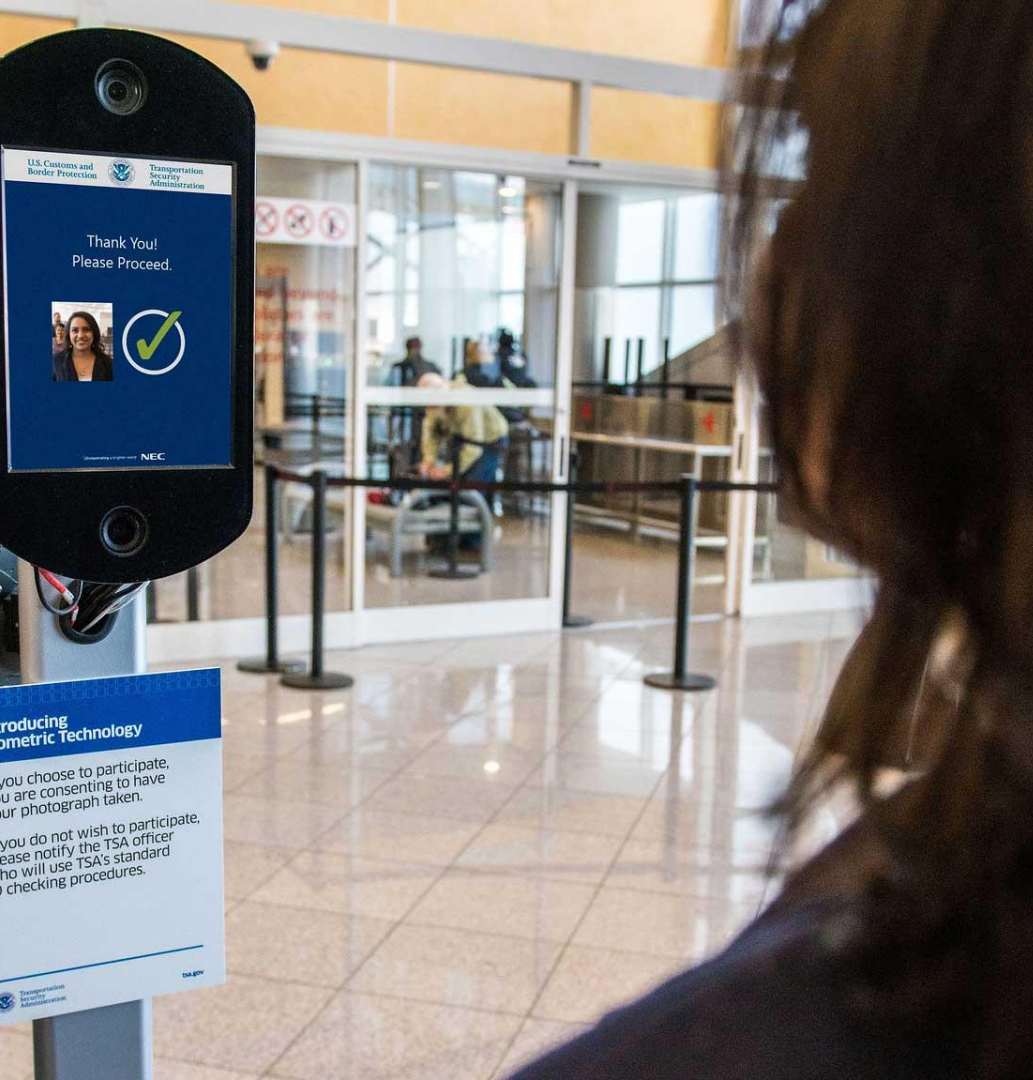
hour of **code dance party**

Hour of Deenest Need















# Machine Learning - addressing specific tasks

```
ret 337
} 338
return ret 339
}, 340
functionArgs:fu 341
var l = fn. 342
if ( l ) r 343
var args = 344
while ( l-- 345
return 346
}, 347
key:quote, //ob 348
functionCode: [ 349
attribute:quote 350
quote, 351
352
353
354
```



2	6	8	9	3	4	7	5	6
3	4	7	9	5	5	7	7	2
5	0	1	0	5	1	5	5	4
5	2	3	4	9	5	6	7	8

# Classification



age: 50  
gender: Female  
race: White



age: 51  
gender: Male  
race: White



age: 52  
gender: Female  
race: White



age: 52  
gender: Female  
race: White



age: 53  
gender: Female  
race: White



age: 54  
gender: Male  
race: Other



age: 50  
gender: Male  
race: Indian



age: 51  
gender: Female  
race: White



age: 52  
gender: Male  
race: White



age: 52  
gender: Female  
race: White



age: 53  
gender: Female  
race: White



age: 54  
gender: Male  
race: White



# What is “Machine Learning” and how does it work?

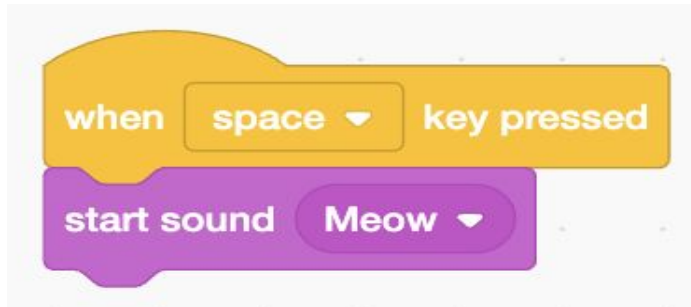
```
ret 337
} 338
return ret 339
}, 340
functionArgs:fu 341
function 342
343
344
345
346
347
348
349
350
351
352
353
354
```

**What does  
programming  
mean?**

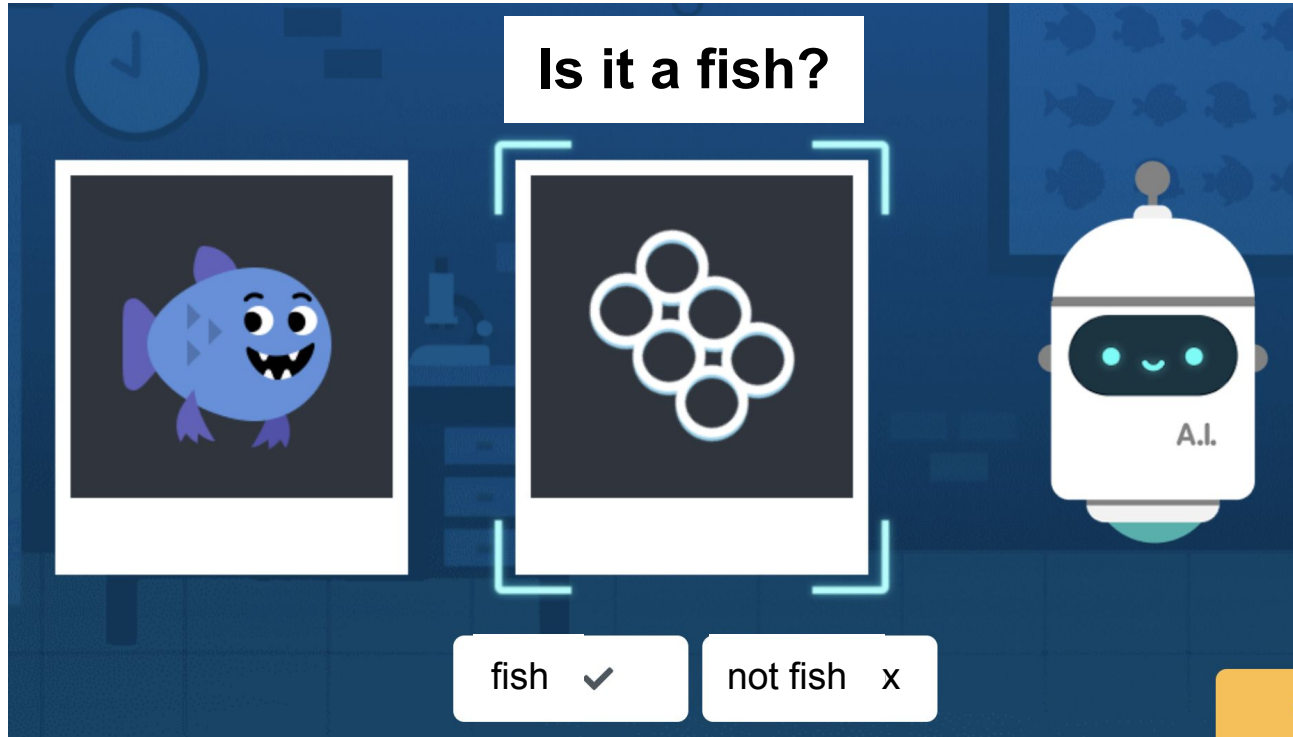




# Explicit programming



# Example-based programming







# Audio

# Text



# Images



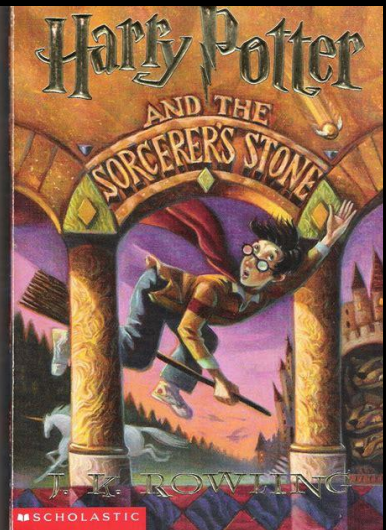
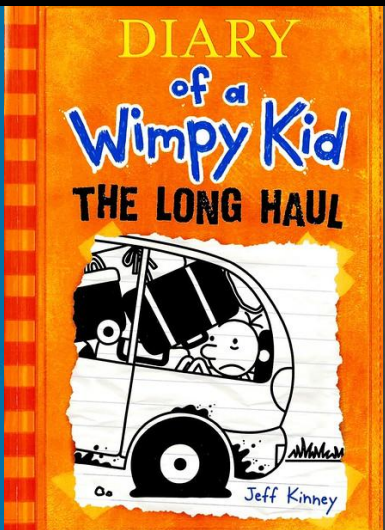
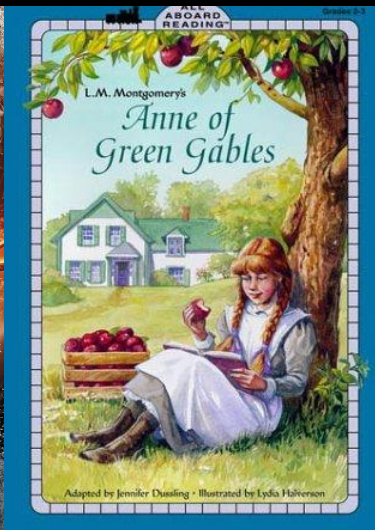
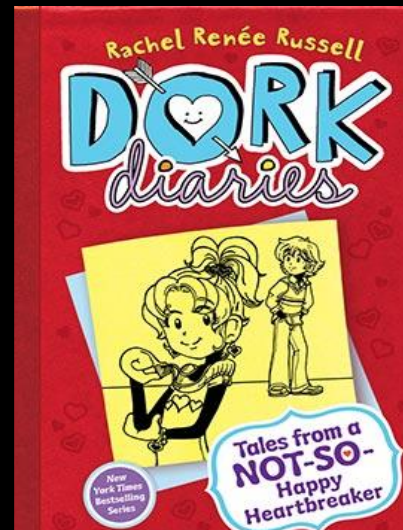
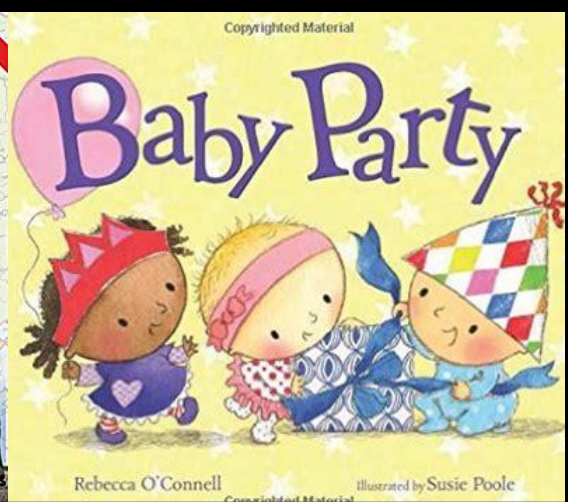
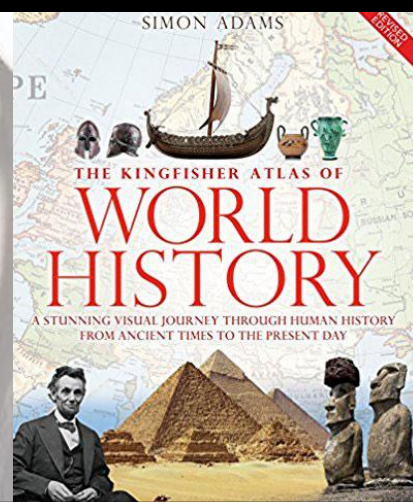
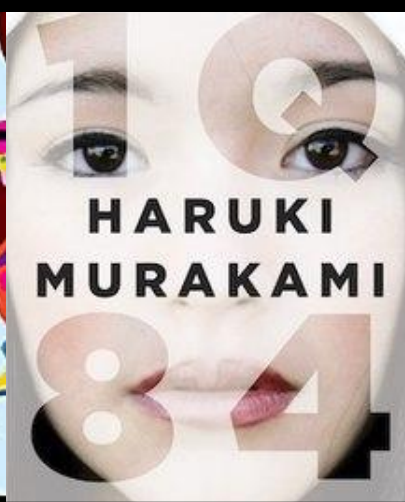
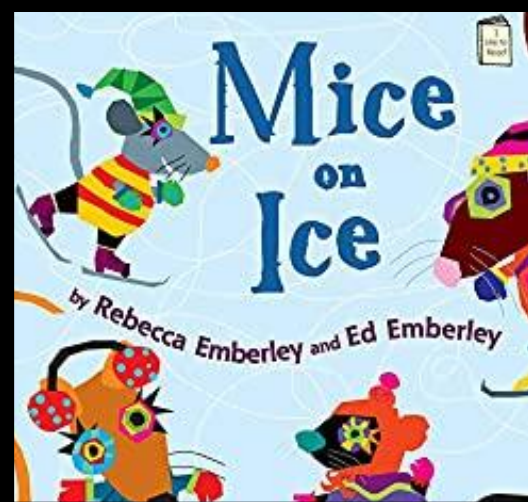
# Video

**Let us try to deal with a new challenge:**

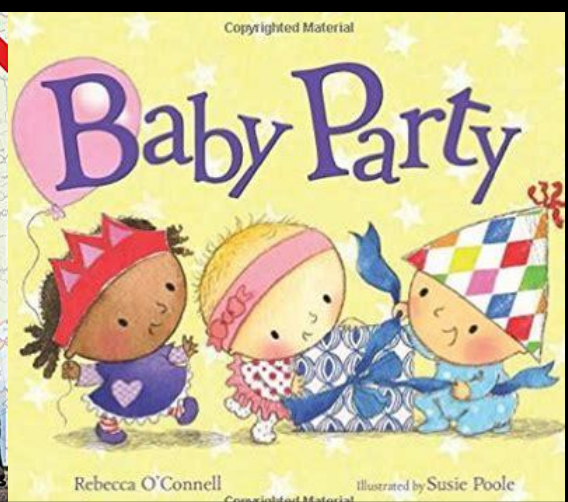
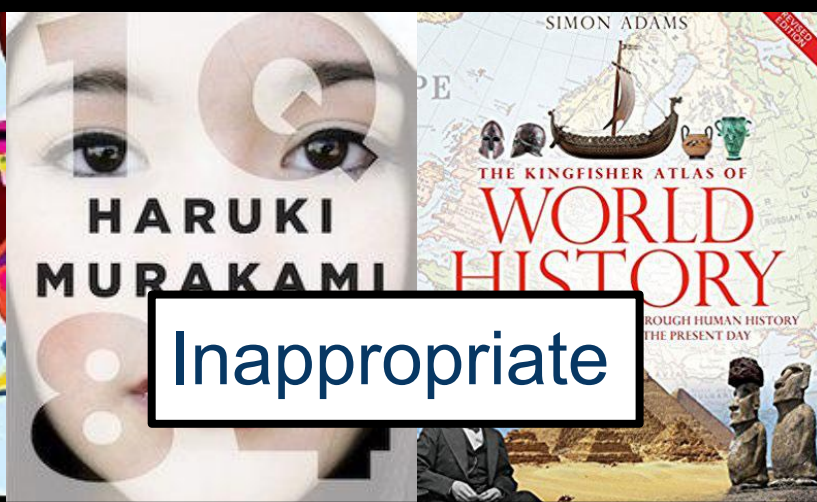
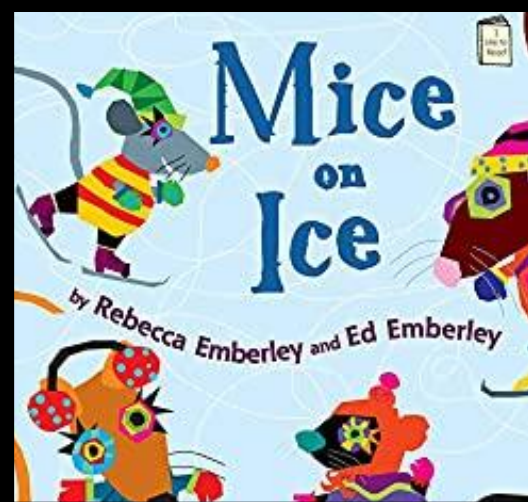
We got a new book. Can we determine *whether or not it is appropriate for children in fourth grade?*



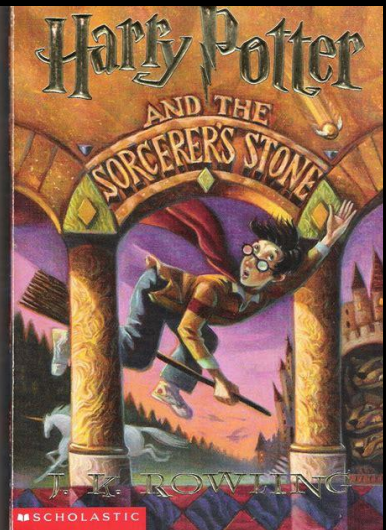
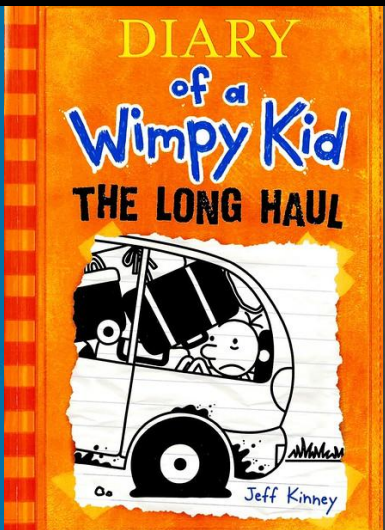
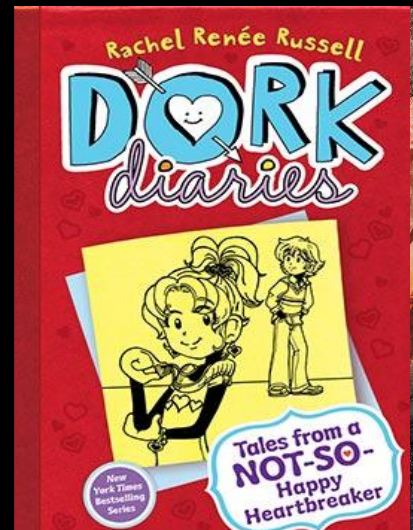








Inappropriate



Appropriate

**Is the cover of the book colorful?**

**What is the thickness of the book cover?**

**Does the book contain animals?**

**How many words are there in the book?**

**How many rare words are there in the book?**

**How many pictures are there in the book?**

**Does the book contain monsters?**

**How many pages are there in the book?**



**What is the thickness of the book cover?**

not thick

thick

**Is the cover of the book colorful?**

**How many words are there in the book?**

no

yes

< 1000

> 1000

**Inappropriate**

**How many pictures are there in the book?**

**Inappropriate**

**How many rare words are there in the book?**

< 5

> 5

< 100

> 100

**Appropriate**

**Inappropriate**

**Inappropriate**

**Appropriate**

**How can the computer  
“learn” to address the  
problem?**



**How can the computer  
“learn” to address the  
problem?**

**By looking at examples!  
For each example: label, features**



# labels

**Books Search**

Keywords

Author

Title

ISBN(s)

Publisher

Condition

Format

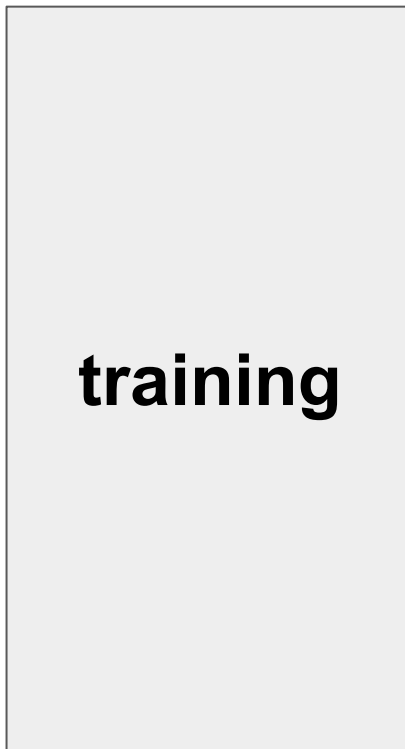
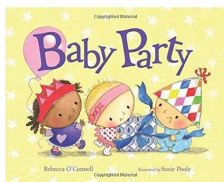
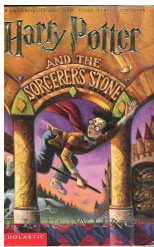
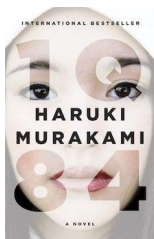
Reader Age

- ✓ All Ages
- Baby-2 Years
- 3-5 Years
- 6-8 Years
- 9-12 Years

Year

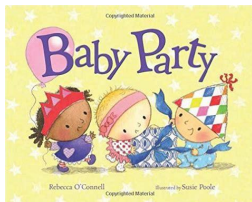
# features

Book name	Thick cover	#rare words	#pictures	#words
Harry Potter	0	2000	2	100000
The Wonderful Things You Will Be	1	10	20	3000

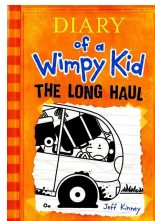
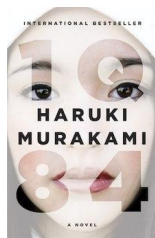


# Colorful cover

yes

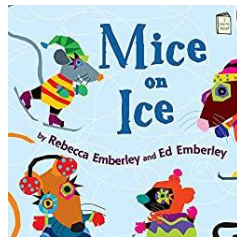
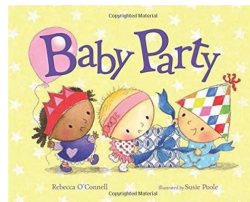


no

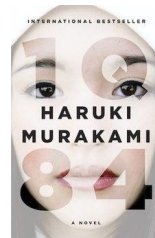


# Number of words

< 1000



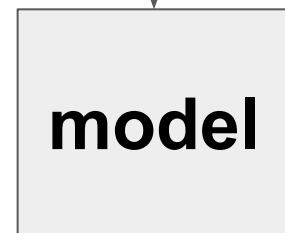
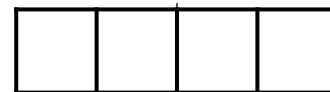
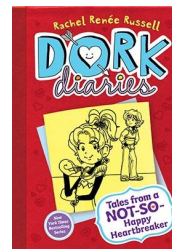
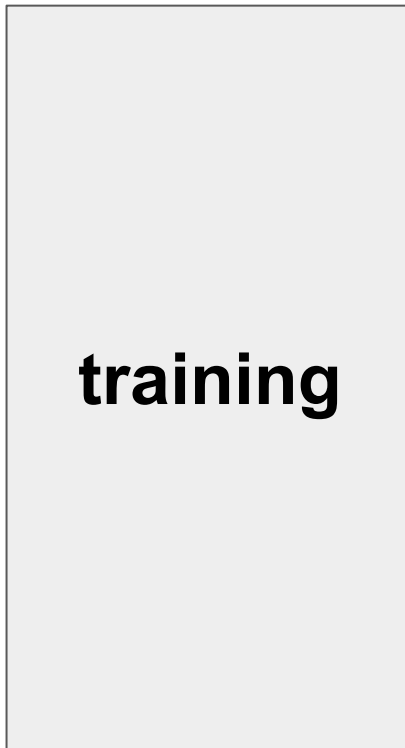
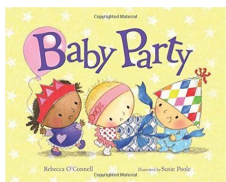
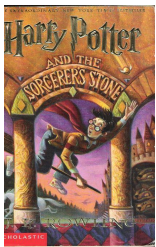
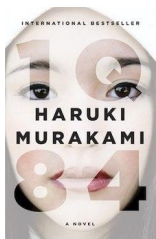
> 1000

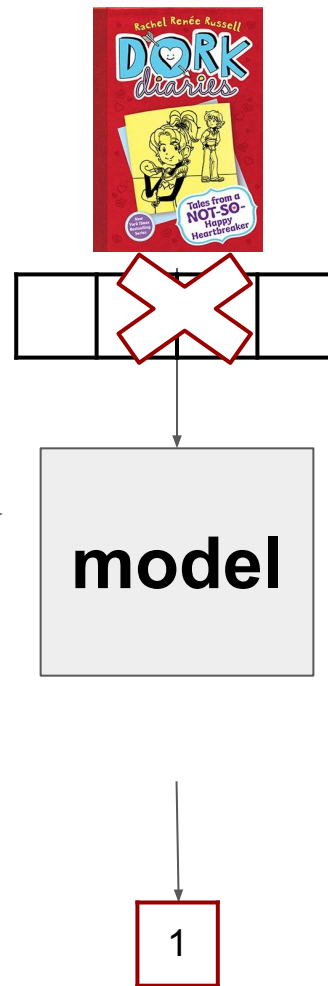
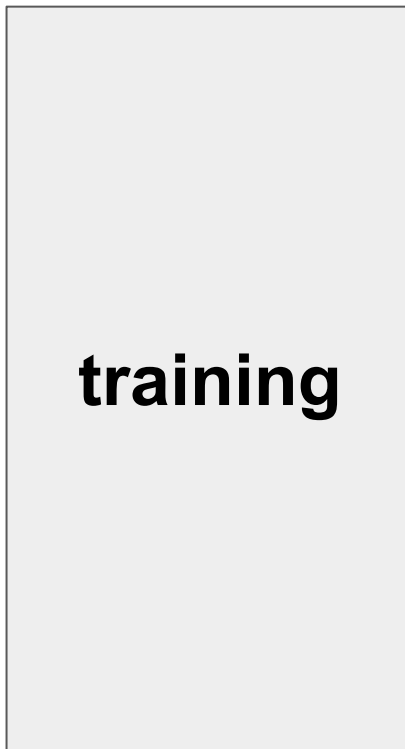
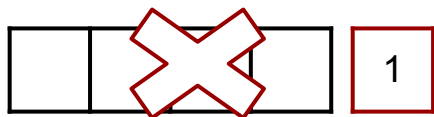
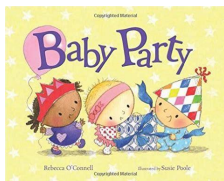
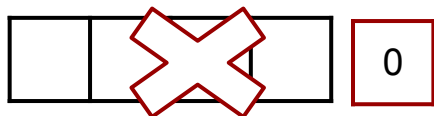
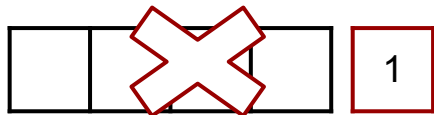
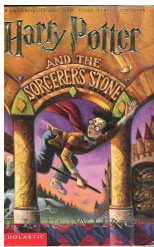
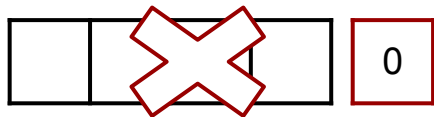
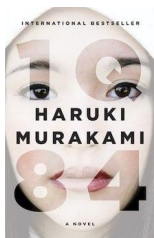


model









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I am, of course. The transformation is complete. I am beautiful. I have perfect golden eyes, six arms, and wings like butterfly wings, iridescent and blue. I am slim and tall. I am an angel.

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I say, "What?"

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"Well, you wouldn't want to leave it lying around. People could trip over it."

"But I'm an angel."

"Yes, dear, you're an angel. But you've been through a lot. You're probably hungry."

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"What?" they say.

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"What do you mean?"

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"There isn't any beef," they say.

"There isn't?" I say.

"No, dear. There isn't."



What does the future hold?







**Thank you!**