

# Practice for Algorithms

Goal of this practice is getting real skills to create algorithms.

Duration: 40 minutes.

1. Create an algorithm to Cook an Omelet.
2. Create an algorithm of Bedtime Routines.
3. Create an algorithm for Classifying Objects: based on mistakes in the homework setup a score.
4. Create an algorithm of Deciding What to Eat.
5. Create an algorithm for Finding a Library Book in the Library.

## *Tips.*

### **1. Algorithm Development Process**

*Step 1: Obtain a description of the problem.*

*Step 2: Analyze the problem.*

*Step 3: Develop a high-level algorithm.*

*Step 4: Refine the algorithm by adding more detail.*

*Step 5: Review the algorithm.*

*Step 6: Draw it*

### **2. High-level algorithm:**

**Problem:** *I need a send a birthday card to my brother, Mark.*

**Analysis:** *I don't have a card. I prefer to buy a card rather than make one myself.*

**High-level algorithm:**

1. *Choose or purchase a birthday card that you think Mark will like.*
2. *Write a personalized message in the card, wishing him a happy birthday and expressing your love and appreciation for him.*
3. *Address and stamp an envelope with Mark's mailing address.*
4. *Put the card inside the envelope and seal it.*
5. *Take the sealed envelope to the post office or a mailbox to send it on its way.*
6. *Optionally, you can also consider adding a small gift or treat along with the card to make the birthday surprise even more special.*

*Remember to send the card early enough to ensure it arrives on or before Mark's birthday!*

### **3. Review the algorithm.**

*Can the algorithm be generalized or is it specific? If it's specific, should it be broadened?*

*For instance, does this algorithm tackle a very particular issue, or does it address a more general problem? For instance, while an algorithm that calculates the area of a circle with a radius of 5.2 meters (using the formula  $\pi 5.2^2$ ) is quite specific, an algorithm that computes the area of any circle (using the formula  $\pi R^2$ ) is more general.*

*Is there a way to simplify this algorithm?*

*One way to calculate the perimeter of a rectangle is to add the length and width together and then add them again. A simpler formula would be:*

*$2.0 * (\text{length} + \text{width})$*

*Is this solution similar to that of another problem? What similarities and differences do they share?*

*For example, consider the formulas for calculating the areas of a rectangle and a triangle:*

*Rectangle area = length \* width Triangle area =  $0.5 * \text{base} * \text{height}$*

*Similarities: Both formulas calculate an area, and both involve multiplying two measurements.*

*Differences: Different measurements are used in each formula, and the triangle formula includes the number 0.5.*

*Hypothesis: It is possible that every area formula involves multiplying two measurements.*

2. Choose free on-line tool to create you algorithm:

<https://online.visual-paradigm.com/diagrams/features/flowchart-tool/>

Background



Freehand ^ x

Start drawing

Stop drawing



1 / 1



100%



Begin

Is time to  
send card?

Yes

Go to supermarket

Take a birthday card

Will Mark like it?

Write message in the  
card

Add address and  
stamp an envelop

Go to postoffice and  
send

End

