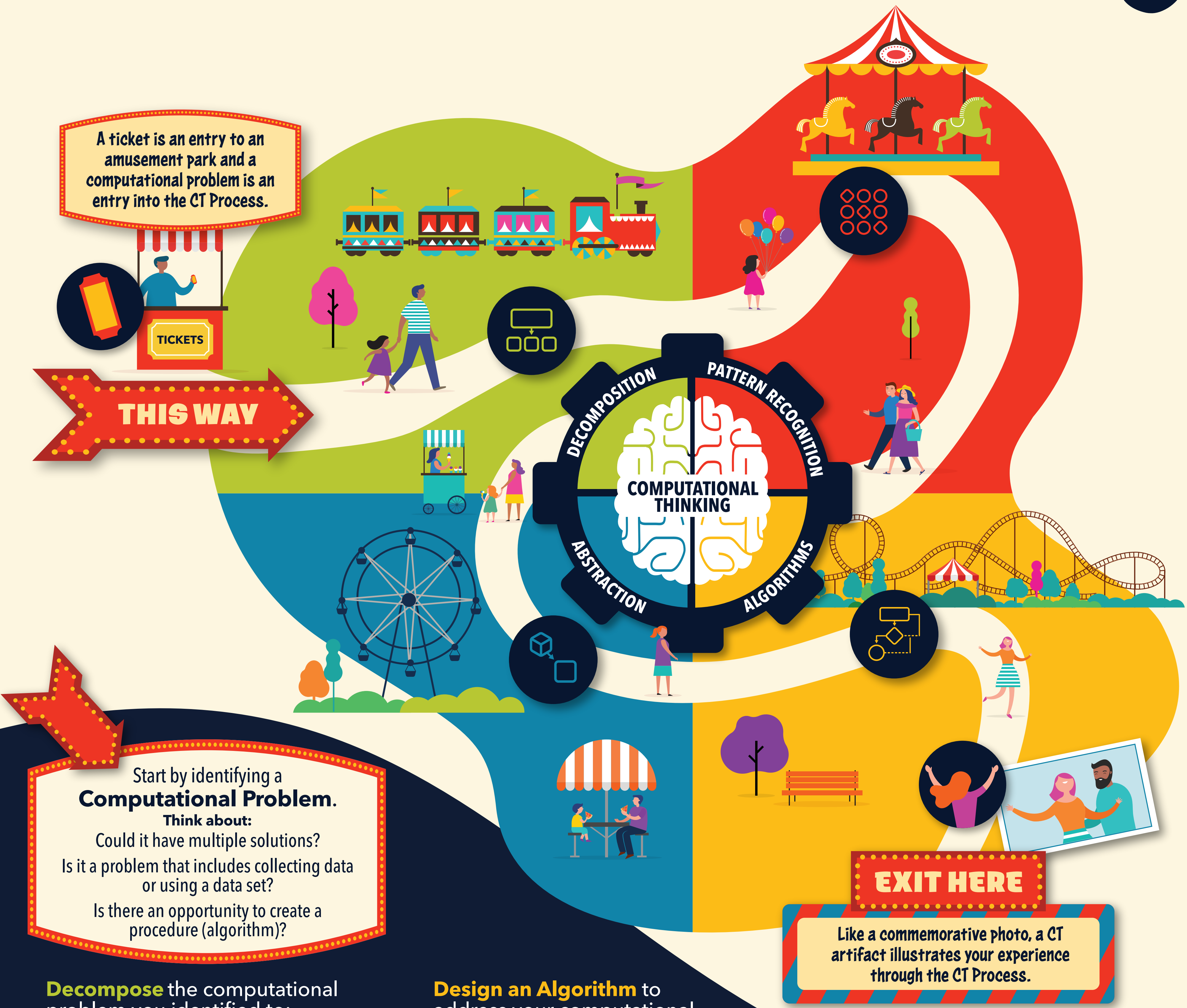
Computational Thinking Process for Problem Solving



A ticket is an entry to an amusement park and a computational problem is an entry into the CT Process.

Start by identifying a **Computational Problem.**

Think about:

Could it have multiple solutions?

Is it a problem that includes collecting data or using a data set?

Is there an opportunity to create a procedure (algorithm)?

Like a commemorative photo, a CT artifact illustrates your experience through the CT Process.

Decompose the computational problem you identified to:

- Help you better understand the problem
- Create sub-parts
- Reveal assumptions or missing information
- Identify where you can use CT elements to address sub-parts
- Help organize your next steps

Use **Pattern Recognition** to address your computational problem by:

- Collecting data or using an available data set
- Analyzing the data
- Representing the data (table, charts, graphs)
- Identify patterns

Use **Abstraction** to simplify complexity and generalize findings

- Abstractions relate to your computational problem
- Pattern recognition and abstraction go hand-in-hand

Design an Algorithm to address your computational problem. Your design can be a flow chart, decision tree, pseudo code, or other approach.

- First, establish a set of procedures
- Then, have others follow your procedures
- Finally, others should arrive at your expected results consistently.
  ~ If others get unexpected results, you will need to modify your design or procedures.

Create your **Computational Artifact.** It, much like an assignment's final report, showcases how you addressed and solved your computational problem.

DEFINITIONS KEY

Computational Problem
Computational problems are open-ended and may be real-world, but they must include data and an algorithm.

Problem Decomposition
Breaking down (unpacking) your computational problem into more manageable parts.

Pattern Recognition
Collecting data or identifying a data set (numerical, text, audio, video, images, or symbols); and analyzing it to find similarities, differences or trends.

Abstraction
Reduces complexity by filtering out non-relevant information. This can simplify problem solving and helps create a general idea of the computational problem.

Algorithm Design
Developing a procedure (algorithm) that can be replicated by humans or computer; includes testing and redesign if the outcome is not what is expected.

Computational Artifact
A computational artifact can be, but is not limited to, a program, image, audio, video, presentation, or web page file; anything a human makes using a computer.

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