How To Solve It

Book by George Pólya
Principles

1. Understand the problem.
2. Devise a plan.
3. Carry out the plan.
4. Review/extend.
Understand the problem

- Often neglected as being obvious, but it isn’t.
- Questions you might ask:
  - What are you asked to do?
  - Can you restate the problem in your own words?
  - Can you think of a picture or a diagram that might help you understand the problem?
  - Is there enough information to enable you to find a solution?
  - Do you understand all the words used in stating the problem?
  - Do you need to ask a question?
Devise a plan

Inside any complex problem is a simpler one. Decompose the problem:
• Solve a simpler problem.
• Make a list, e.g. of smaller sub-problems.
• Look for patterns or sub-problems you recognize
• Set aside sub-problems to work on later
• Draw a diagram of the sub-problems
Problem solving

Some things we know about problem solving:

• You need to be able to set the problem aside when you are stuck.

• Some parts of problem solving are best done with others—other parts are best done alone.
Carry out the plan

In a programming course, this is the actual programming part: putting your ideas into code.

If your plan has sufficient detail, carrying it out can be relatively easy.
Review, Reflect and Extend

An important, but usually overlooked step, is to review and reflect on your solution, and then consider extensions.

What you do is submit your solution with satisfaction, but no reflection on how to do it better.