

Computational Thinking

Applying principles to solve problems



In this activity, you will learn to apply the four pillars of **Computational Thinking** to solve real-world problems through logic and systematic processes.

A. Explore the Scenario

Imagine you are developing a digital library system for your school. The current manual process of borrowing books is inefficient, causing long queues. To fix this, you must break down the problem of 'borrowing a book' into smaller steps. You need to identify patterns in how students search for books, abstract the necessary user data, and design a logical sequence of actions (an algorithm) that the system should follow to register a loan.

This passage was created using AI.

1. Analyze the Pattern

After reading the text, answer the following questions to decompose the library problem.

a.) What are the smaller, manageable sub-problems involved in the book borrowing process?

b.) What common patterns do you notice in how different students interact with a library catalogue?

c.) If you were to simplify this system, what specific details (data) are essential, and what details can be ignored?

2. Build the Algorithm

Write a step-by-step **algorithm** that describes the logic of a successful book loan. Use the variables S for student ID and B for book code.

Algorithm Step	Your Response
1	Type your logic here
2	
3	



To the students

To write an expression or equation, go to Canva apps and search for equations. Then type in your equation using the tool.

3. Solve the Problem

Apply your algorithm to the following scenario: A student tries to borrow a book that is already marked as 'loaned'. How should your algorithm handle this error?

D. Apply the Equation

Use your understanding of **Abstraction** and **Decomposition** to address these new challenges.

a.) If the library adds a 'penalty fee' calculation, how would you integrate this into your existing algorithm?

Answer Key

1. **Decomposition:** Identifying user verification, book availability check, and record updating as sub-tasks.
2. **Pattern Recognition:** Many users search by title, while others use author names. Both require a search input field.
3. **Abstraction:** Necessary data: Student ID, Book ID. Unnecessary: Student's favourite genre, book publisher's address.
4. **Algorithm:** 1. Input S and B. 2. If B is 'Available', update record. 3. Else, display 'Book Loaned'.

Teaching note



This activity introduces Grade 10 students to Computational Thinking pillars. Focus the classroom discussion on the transition from real-world workflows to programmatic logic. Encourage students to critique each other's algorithms for efficiency. This was generated by AI to give you a head start — not the final word. You know your students best, so give it a once-over and make it yours.