The Business Optimizer's Toolkit: Solving Problems with Computational Thinking

Materials Needed:

- A large whiteboard, chalkboard, or several large sheets of paper
- Sticky notes (at least two different colors)
- Markers or pens
- A "Top Secret" folder or envelope (to add to the fun)
- Optional: A computer with internet access for a free flowchart tool (like diagrams.net or Canva)

Lesson Plan

Part 1: The Briefing (10 minutes)

Goal: To introduce the core problem and establish the student's role as a consultant.

Activity:

1. Hand the student the "Top Secret" folder. Inside is their mission brief.
2. **Your Mission Brief:**

   "You are a highly sought-after Business Optimization Consultant who specializes in computational thinking. A new client, 'Pixel Pizzeria', has hired you. Their new downtown location is popular, but completely chaotic. Customers complain about long wait times, they frequently get the wrong toppings, and the staff seems overwhelmed and confused. The owner is losing money and reputation fast.

   Your mission, should you choose to accept it, is to use your expert toolkit—Decomposition, Pattern Recognition, Abstraction, and Algorithm Design—to diagnose the problems and design a new, efficient system for running the pizzeria. You will present your final, optimized process back to the CEO (me)."

3. **Learning Objectives (Discuss these openly):**
   - By the end of this session, you will be able to:
   - **Decompose** a complex business process into smaller, manageable steps.
   - **Recognize patterns** of inefficiency or failure within that process.
   - **Abstract** away irrelevant details to focus on the core problem.
   - **Design a clear algorithm** (a step-by-step solution) to create a more efficient and profitable business model.

Part 2: Decomposition - "Mapping the Chaos" (20 minutes)

Goal: To break down the current, flawed pizza-making process into its component parts.

Activity:

1. On the whiteboard, create a starting point ("Customer Enters") and an ending point ("Customer Leaves with Pizza").

2. Using one color of sticky notes, have the student map out *every single step* that currently happens at Pixel Pizzeria. Encourage them to be very detailed and think about what could go wrong.
3. **Guiding Questions:**
    - "A customer walks in. What happens first? Where do they go?"
    - "How do they see the menu? How do they order?"
    - "Who takes the order? Where does the order go next?"
    - "How does the kitchen know what to make? What are the steps to making one pizza?"
    - "How is payment handled? Does it happen before or after they get their food?"
    - "How does the finished pizza get back to the right customer?"
4. Arrange the sticky notes chronologically on the board. The result should look like a messy, complicated flowchart. This is the "before" picture.

Part 3: Pattern Recognition - "Finding the Failures" (15 minutes)

Goal: To analyze the decomposed map and identify recurring problems or bottlenecks.

Activity:

1. Give the student the second color of sticky notes.
2. Their task is to place these new sticky notes on the map wherever they spot a problem, a delay, or an inefficiency. These are the "bug reports" for the system.
3. **Guiding Questions:**
    - "Where in this process are mistakes most likely to happen? (e.g., getting toppings wrong)."
    - "Do you see any loops or repeated steps that are wasting time? (e.g., the cashier running to the kitchen to ask a question)."
    - "Where would the longest lines form? What are the biggest bottlenecks?"
    - "Are there tasks that could be done at the same time but currently are not?"
    - "What is the most common customer complaint you can imagine based on this map?"
4. Discuss the patterns that emerge. For example: "It looks like the single person taking orders and payment is a major pattern of failure."

Part 4: Abstraction & Algorithm Design - "Creating the Solution" (30 minutes)

Goal: To ignore the minor details, focus on the core functions, and design a new, streamlined process.

Activity:

1. **Abstraction First:** Ask the student to define the essential "modules" of a successful pizzeria. They should write these on the board as large headings.
    - Examples: 1. ORDERING & PAYMENT, 2. PIZZA PREPARATION, 3. QUALITY CHECK, 4. DELIVERY/PICKUP.
    - This step helps them abstract away the previous chaos and focus on what *must* happen.
2. **Algorithm Design Next:** The student will now design a new, improved workflow. They can draw a flowchart, write numbered steps, or create a new sticky note map. This is their creative solution.
3. **Encourage innovation and creativity:**
    - "How can we solve the 'wrong topping' problem? (e.g., a printed ticket system, a screen in the kitchen)."
    - "How can we speed up the line? (e.g., a dedicated cashier, a self-service kiosk, taking payment at the time of order)."
    - "Could we create specialized jobs? (e.g., a 'Dough Master', a 'Toppings Specialist', an 'Oven Operator')."

    - "Think about the physical layout. How could you arrange the counters to make the flow smoother?"
    - "Is there a simple tech solution? Maybe an app for ordering ahead?"
4. The final result should be a clear, logical, and efficient step-by-step process—an algorithm for running the perfect pizzeria.

Part 5: The CEO Pitch - "Presenting Your Solution" (15 minutes)

Goal: To assess the student's ability to articulate their solution and justify it using the language of computational thinking.

Activity:

1. The student presents their new algorithm to you, the CEO of Pixel Pizzeria.
2. They should not just explain the new process, but also *why* it is better. They must reference the specific problems (patterns) they identified in the old system.
3. **Simple Presentation Rubric (for your evaluation):**
    - **Problem ID:** Did they clearly explain the flaws in the old system using their decomposed map and recognized patterns?
    - **Solution Logic:** Is their new algorithm logical, clear, and easy to follow?
    - **Justification:** Did they effectively connect their solutions back to the specific problems they found? (e.g., "To fix the long wait times, I created two roles...")
    - **Creativity:** Did they include any innovative or clever ideas in their solution?
4. Conclude by congratulating the consultant on a job well done and saving the business!

Extension & Follow-Up (Optional)

Challenge Question: "Your system works perfectly! Now, the client wants to add home delivery. How would you modify your algorithm to include online orders and a team of delivery drivers? What new problems or patterns might you need to solve?"