CSIRO

digitalcareers

Australian Government

Bebras Australia

computational thinking challenge

March

delivered online

Sept

Computing knowledge not required

FREE

Bebras 365

Years 3-12

www.bebras.edu.au

WHAT IS COMPUTIONAL THINKING?

A way of thinking that promotes problem-solving using a number of skills and attributes. It can be applied across life and doesn't require technology. Computational Thinking skills include ***logic, pattern recognition, evaluation and algorithms.*** All careers use problem solving skills – careers of the future will use these skills in conjunction with technology. These will include:

Managing Resources - understanding how to best use resources from around the world to meet community and business needs
Analysis - understanding the connection between data and how we use data to improve business and community outcomes
Creativity - finding new ways and techniques to express human experience
Safety - understanding and applying technology to create safe environments

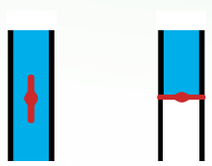
WHY IS COMPUTATIONAL THINKING IMPORTANT?

Problem solving skills are vitally important to all aspects of our lives, not just to a career. Learning how to solve complex problems will be key as our world becomes more connected and complex.

WHAT DOES THE CHALLENGE LOOK LIKE

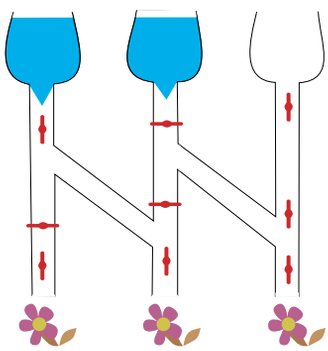
Using comprehension style questions with images, students can work independently or in groups of up to 4 to solve the Challenge questions. The Challenge is broken into five age divisions (Year 3-4, Year 5-6, Year 7-8, Year 9-10 & Year 11-12). The questions are designed to be answered in 3 minutes and there are a total of 15 questions in each year division. Below is a question designed for Year 3-4 students from an earlier Challenge.

The diagram to the right shows how a watering system is connected. The system consists of tubes and valves. Open and closed valves are shown in the diagram by the direction of the switch. Water only flows through the open valves.

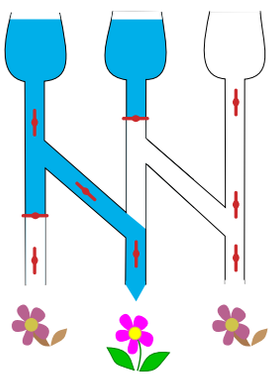


Open valve **Closed valve**

Which of the flowers (if any) will receive water when the valves are in the position shown below?



Answer: Only the second flower



Explanation
It's Computational Thinking
Concepts - Algorithmic Thinking

Computers are made up of various chips which are made up of even smaller parts: electronic circuits. Electronic circuits are in turn composed of logic gates.

Logic gates act like valves, except that instead of water they conduct electricity and instead of pipes they have wires. This means our modern electronic devices (including complex ones like computers and smartphones) are built from simple logistical operations.

"The students really enjoyed the nature of the problem-solving challenges presented to them through this program. It is a great resource and I am hoping we can continue to use it within our classroom teaching."

Andrew Russell
Head of Technology
Clayfield College

"When our students participated there was a high level of engagement from boys and girls. The problems were challenging but fun. Bebras is an activity that supports group work and computational thinking. We are planning to make this a regular component of our digital technologies curriculum."

Kylie Docherty
Teacher of IT
Mansfield State High School