Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Logic Lab

## Instructions

* In teams of 3, you will solve a series of 6 logic puzzles posted at stations around the room and write the algorithm you used to solve each one.
* For each puzzle, your team will
  1. Solve the puzzle any way you can.
  2. Solve it again, this time paying careful attention to the steps you took.
  3. Write the input and output of the task, then the algorithm you used to solve it.
* You may do the puzzles in any order.

## Station A: Winning tic tac toe

|  |  |
| --- | --- |
| Task  It’s **X**’s move, and **O** has just made a serious blunder. Devise an algorithm for selecting **X**’s next 3 moves that is guaranteed to win no matter what **O** does on its 2nd and 3rd moves. | |
| Input  A tic tac toe board with an **X** in square 5  and an **O** in square 6, with **X** to move. | Output  **X**’s best play on move 2, and **X**’s best play on moves 3 and 4 for each possible play **O** could make on moves 2 and 3. |
| Algorithm (hint: you’ll need a nested-if statement) | |

## Station B: Building the Schattman Staircase

|  |  |
| --- | --- |
| Task: Using dominoes, build the structure shown in the picture at Station B | |
| Input: 29 dominoes in a box | Output: 29 dominoes stacked in the shape of the Schattman Staircase |
| Algorithm (hint: use a loop) | |

## Station C: The Towers of Hanoi

|  |  |
| --- | --- |
| Task:  Move the four coin from stack A to stack C while obeying the following two rules:  \* *Only the top-most coin of a stack may be moved.*  *\* No coin may ever be placed on top of a smaller coin.* | |
| Input | Output |
| Algorithm (hint: it can be done in 15 moves!) | |

## Station D: Make a Square Knot

|  |  |
| --- | --- |
| Task:  Tie this knot:  source: http://www.animatedknots.com/reef/ | |
| Input | Output |
| Algorithm | |

## Station E: Penguin Families

|  |  |
| --- | --- |
| Task:  Win the computer game *Penguin Families* for 3 penguin-pairs. (The URL for the game is on Edmodo.)  Then write an algorithm that uses a loop to solve the general problem for *N* penguin-pairs. | |
| Input: *N* penguin-pairs in *N* different colours and an ice-float on side A side of a river. | Output: |
| Algorithm (use a loop) | |

## Station F: Bridge Crossing

|  |  |
| --- | --- |
| Task:  Win the computer game *Bridge Crossing*. I’ve posted the URL for the game on Edmodo. | |
| Input | Output |
| Algorithm (no loop required. Just write out each step) | |