CSC148: 20161018

DEBUGGING RECURSION

A RECURSIVE PROGRAM IS CORRECT IF:

1. ALL BASE CASES ARE CORRECT.
2. RECURSIVE STEP IS CORRECT, ASSUMING ALL RECURSIVE CALLS ARE CORRECT, AND RECURSIVE CALLS ARE MADE ON SMALLER INPUTS.

THUS, A RECURSIVE PROGRAM IS INCORRECT IF:

1. A BASE CASE IS INCORRECT.
2. A RECURSIVE STEP IS INCORRECT BECAUSE IT MAKES RECURSIVE CALLS ON BIGGER / SAME-SIZE INPUTS.
3. A RECURSIVE STEP IS INCORRECT, EVEN ASSUMING ALL RECURSIVE CALLS ARE CORRECT.

DEBUGGING RECURSION:

1. MANUAL TRACING (BASE CASE ONLY)
2. CHECKING THE RECURSIVE CASES

   ⟶ IS THE INPUT ARGUMENT SMALLER THAN THE ORIGINAL?

DO NOT TRACE INTO RECURSIVE CALLS!

ASSUME RECURSIVE CALLS RETURN THE CORRECT VALUE AND MAKE SURE THAT THE CODE USES THESE VALUES CORRECTLY.

DESIGNING RECURSIVE FUNCTIONS

1. IDENTIFY THE RECURSIVE STRUCTURE OF THE DATA.
2. IMPLEMENT THE BASE CASES CORRECTLY.
3. WRITE DOWN A CONCRETE, MEDIUM-SIZED EXAMPLE.
4. FIGURE OUT HOW TO COMBINE THE RECURSIVE CALLS TO GET THE FINAL RESULT.