

APPENDIX A

Pencil Code – Recommended Coding Standards

Variable Naming Conventions:

- Variable and method names like `countPegs`, `x`, or `total` are lowercase, with occasional upperCase characters in the middle. Some call this the `interCap` method for naming variables. For example, a proper variable name is `numStudents` rather than `NumStudents` OR `num_students` OR `numstudents`.
- Constant names are UPPERCASE, with an occasional `UNDER_SCORE`. For example, `BANK_FEE` is a good constant name rather than `BANKFEE` or `bankFee`.
- There are spaces after keywords like “if” and surrounding binary operators like “=” or “+”.
- There should be NO space after a function name like `connectionCost` or like `sqrt`. (In CoffeeScript, no space is even allowed between the function name and the parentheses in a function call!)
- You should use constants where appropriate.
- Every function must have a comment.
- Functions must be short: a rule of thumb is to limit them to 30 lines of code.

The following rules specify when to use upper- and lowercase letters in identifier names.

- Prefer lowercase for variable and function names (maybe with an occasional upperCase in the middle to help separate words); for example, `firstPlayer`.
- When using all-uppercase for constants, use underscores to separate words for example, `CLOCK_RADIUS` rather than `CLOCKRADIUS`.

Names must be reasonably long and descriptive. Your program is considered to be self-documenting if its variable names are descriptive.

Braces:

- Braces should never be omitted where they are allowed. Although JavaScript allows single-line `if`, `while`, and `for` statements without braces, the braces should always be used with these statements. For example, in the example above, the braces after the “if” are not strictly required by the language, but they should be included. Missing braces here is one of the leading sources of bugs in professional code! Many professionals have learned over time to always include the braces.
- In CoffeeScript, of course, braces are not used because indents are used to reflect the nesting structure.

Indents:

- In JavaScript, every block of code surrounded by a `{ }` should be indented evenly by two spaces. Even though intents are not required in JavaScript, they should be used just as you are required to use them in CoffeeScript.
- Pencil Code by default uses 2-space indents.

Sample Code to illustrate the programming standards stated above:

```
// How far apart are the points which must be connected
// to the origin? Five sets them five points apart.
INCREMENT_AMOUNT = 5;

// connectionCost totals up the cost for connecting each
// point within an (x, y) rectangle to the origin, assuming
// the points are in a grid determined by INCRMENT_AMOUNT
// and the cost per unit distance is given by costPerMile.
// Only points farther than minDist are included.
function connectionCost(x, y, minDist, costPerMile) {
  var total = 0;
  for (var i = 0; i < x; i += INCREMENT_AMOUNT) {
    for (var j = 0; j < y; j += INCREMENT_AMOUNT) {
      var dist = sqrt(x * x + y * y);
      if (dist > minDist) {
        total += costPerMile * dist;
      }
    }
  }
  return total;
}
```