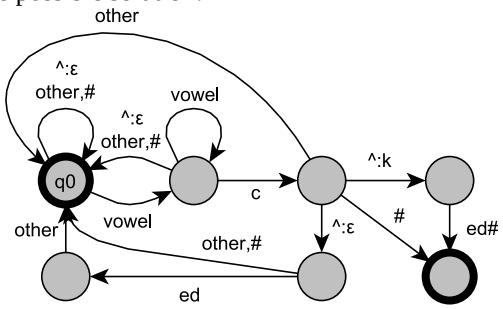
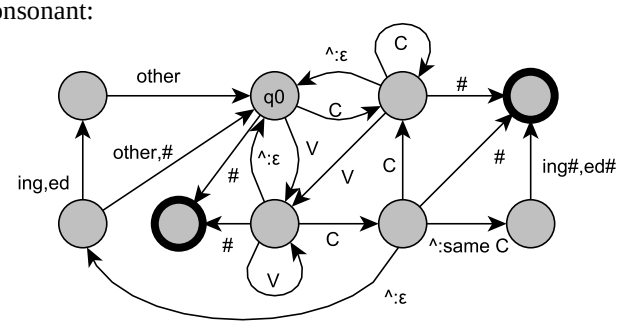
3.3 Write a transducer(s) for the K insertion spelling rule in English.

One possible solution:



3.4 Write a transducer(s) for the consonant doubling spelling rule in English.

One possible solution, where V stands for vowel, and C stands for consonant:



3.5 The Soundex algorithm (Knuth, 1973; Odell and Russell, 1922) is a method commonly used in libraries and older census records for representing people's names. It has the advantage that versions of the names that are slightly misspelled or otherwise modified (common, e.g., in hand-written census records) will still have the same representation as correctly spelled names. (e.g., Jurafsky, Jarofsky, Jarovsky, and Jarovski all map to J612).

1. Keep the first letter of the name, and drop all occurrences of non-initial a, e, h, i, o, u, w, y.
2. Replace the remaining letters with the following numbers:
   b, f, p, v → 1
   c, g, j, k, q, s, x, z → 2
   d, t → 3
   l → 4
   m, n → 5
   r → 6
3. Replace any sequences of identical numbers, only if they derive from two or more letters that were *adjacent* in the original name, with a single number (e.g., 666 → 6).
4. Convert to the form `Letter Digit Digit Digit` by dropping digits past the third (if necessary) or padding with trailing zeros (if necessary).

The exercise: write an FST to implement the Soundex algorithm.