Week 7 tutorial
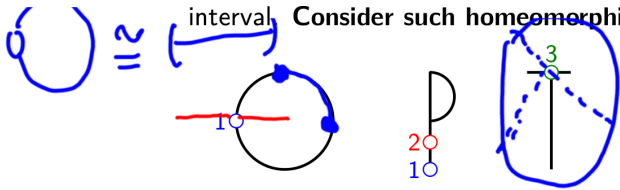
Exercise 7.0. This is an unseen exercise in Applied Topology. In the diagram below, each letter of the English alphabet is drawn as a union of straight line segments and arcs.

A B C D E F G H I J K L M N

O P Q R S T U V W X Y Z
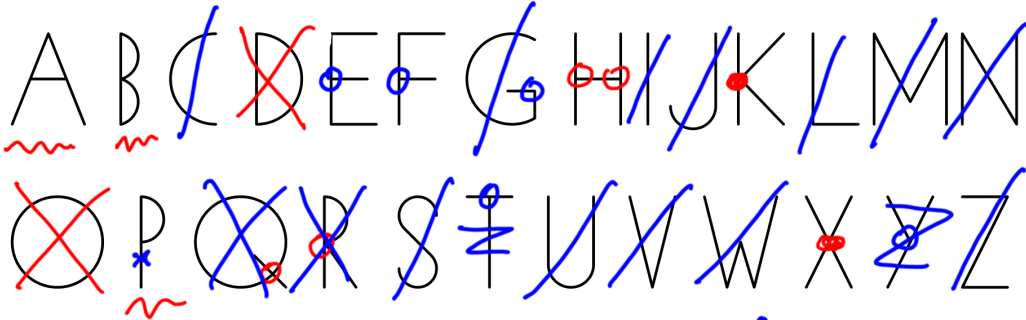
Some letters are homeomorphic: for example, C ≅ J, both are homeomorphic to a closed interval. **Consider such homeomorphisms to be geometrically obvious.**

$$O \not\cong () \cong [\ ]$$

O ≇ P: O has no points of connectivity 2 but P has them;

T ≇ O and T ≇ P: T has a point of connectivity 3 while O, P have no such points.

CHALLENGE. Sort the letters into homeomorphism classes. You should have 9 classes.

⑫ **Class 1:** C G I J L M N S U V W Z   **Class 5:** R, Q (1pt of C3, ∞ pts C1)

⑭ **Class 2:** K, X (have point of conn 4)   **Class 6:** O, D (all pts C1)

⑮ **Class 3:** H (has 2 pts of conn 3)   **Class 7:** B (∞ pts C1, 1 pt C2)   A, B, P

Class 4: E F Y T (have 1pt of c3 & 3pts of C1)   **Class 8:** A

   Class 9: P

$$E \not\cong F \quad R \cong Q = Q$$

3 pts of C1   ∞ pts of C1

2 B   A ≇ I

Connectivity 2