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1. (10 points)

(a) **Answer:** $C = \{01, 010, 101\}$ is **not UD** since, for example, suppose we have that

$$a_1 \rightarrow 10$$

$$a_2 \rightarrow 010$$

$$a_3 \rightarrow 101.$$

Then

$$101010$$

can be decoded into codewords $\underbrace{10}_{a_1}, \underbrace{10}_{a_1}, \underbrace{10}_{a_1}$ or codewords $\underbrace{101}_{a_3}, \underbrace{010}_{a_2}$.(b) **Answer:** $C = \{0, 01, 011, 0111\}$ is **UD** since it is a suffix code.(c) **Answer:** $C = \{21, 20, 201, 202, 212\}$ is **UD** since it is a suffix code.(d) **Answer:** $C = \{1, 21, 221, 002, 021, 001\}$ is **UD** since it is a prefix code.(e) **Answer:** $C = \{10, 12, 13, 22, 121, 133, 220, 221, 223\}$ is **UD** since it is a suffix code.