1. (section 20.6) Compute the Resnik similarity score between two pairs of words using the hierarchy below. The numbers next to the concepts in the hierarchy are the probabilities of each concept. For example, $P(\text{mammal}) = 0.12$

- animal 0.18
- mammal 0.12
- dog 0.07
- cat 0.05
- terrier 0.02
- hound 0.03
- tabby 0.01

$\text{resnik-sim(terrier, cat)} =$

$\text{resnik-sim(terrier, tabby)} =$

2. Section 20.7 talks about representing words with context vectors. A word's meaning is simply a vector of other nearby words. Below are three vectors for three words containing only the verbs with which they occur.

- **Baggins**: [fight 3, run 8, say 5, eat 8, flee 7]
- **Gamgee**: [fight 5, run 4, say 9, eat 8, flee 4]
- **Nazgul**: [fight 8, run 1, say 1, eat 0, flee 1]

a. Compute cosine similarity. *Calculate fully, show work, but simplify answer to one final decimal number.*

$\text{simCosine(baggins, gamgee)} =$

$\text{simCosine(baggins, nazgul)} =$

b. Compute the Dice score. *Calculate fully, show work, but simplify answer to one final decimal number.*

$\text{simDice(baggins, gamgee)} =$

$\text{simDice(baggins, nazgul)} =$