Question 1:   [5 pts]

Let us define the goal of computational semantics as the automated conversion of meaning expressed in linguistic form into some formal representation directly exploitable for automated semantic tasks.

With this definition in mind, we want to implement some form of computational semantics for representing the meaning of English documents.

1.1[1pt] What type of semantics shall we consider for this? (Select only one):

  [ ] Some form of lexical semantics
81%[ ] Some form of compositional semantics

We consider the two approaches described below. Analyze each of them by indicating the different aspects of the above definition (if any) you think are satisfied.

Approach 1: Each document is first sent by mail to a large number of randomly selected (human) recipients, with the request to summarize the document in at most 100 words, and a group of experts then selects among the received answers the most adequate summary as the representation of the meaning of the document.

1.2[2pts] Analysis of the proposed approach (circle "Yes" if the aspect is satisfied, and "No" otherwise):
95%[Yes | No] Automated conversion
94%[Yes | No] Conversion of meaning expressed in linguistic form
87%[Yes | No] Conversion into some formal representation
90%[Yes | No] Representation directly exploitable for automated semantic tasks

Approach 2: Each document is first associated to a vector in which the ith component corresponds to the frequency in the document of the ith character in the used character set, and then the cosine similarity is used to quantify semantic proximities between the vectors associated to the documents.

1.3[2pts] Analysis of the proposed approach (circle "Yes" if the aspect is satisfied, and "No" otherwise):
95%[Yes | No] Automated conversion
84%[Yes | No] Conversion of meaning expressed in linguistic form
94%[Yes | No] Conversion into some formal representation
22%[Yes | No] Representation directly exploitable for automated semantic tasks

Question 2:   [6 pts]

2.1[1pt] The words *bite* in "he ate the sandwich in one bite" and *byte* in "the program needs a byte of memory" are (select only one):

        [ ]   Homographs
97%[ ]   <mark>Homophones</mark>
        [ ]   Homonyms
        [ ]   Polysems

Consider the following excerpt from an English dictionary:

pen (from the latin: penna)
1.   an instrument for writing or drawing with ink
pen (from the Old English: penn)
1.   a small enclosure in which farm animals are kept
2.   (in the West Indies) a farm or plantation

2.2[2pts] The words *pen* in "I need a pen to fill in the form" and *pen* in "the cows are in the pen" are (select only one):

        [ ]   Homographs
        [ ]   Homophones
95%[ ]   <mark>Homonyms</mark>
        [ ]   Polysems

Consider the following possible meanings for the words *table* and *armchair*:

table
a piece of furniture with a flat top and one or more legs
armchair
a piece of furniture for a person to sit on with side supports for the person's arms

2.3[3pts] Apply the Aristotelian principle to represent these two meanings with semantic relations in a way that allows to distinguish one from the other (provide your answer in a form of a directed graph, where arcs are labeled with semantic relations):

71%<mark>(leg)—[meronym]➔(table)—[hyponym]➔(furniture)</mark>
<mark>(support)—[meronym]➔(armchair)—[hyponym]➔(furniture)</mark>