Name: SID:

COMP 4446 / 5046 Quiz 2 (week 6) - version B

If the choices have ◯ then select exactly one option. If the choices have □, select all correct options. Indicate your answer by filling the shape, e.g., ●. If you make a mistake, draw an X over your answer, e.g., ⊠.

1. (1 mark) Which of the following are true of top-P and top-K sampling? Select all true statements.
   - □ Neither one considers the probability distirbution when filtering.
   - ■ **They are both greedy methods.**
   - ■ **They both use randomness to choose the output.**
   - □ Their filtering step is the same, but they sample differently.

2. (1 mark) Which of the following are true of PyTorch? Select all true statements.
   - ■ **It is a library for neural networks.**
   - ■ **It supports training and applying models.**
   - □ It requires a GPU to run code.
   - □ It is built on top of Tensorflow.

3. (1 mark) Consider the sentence, ”Zach found people with a telescope.” If we have a parse with an edge from ”with a telescope” to ”found”, what does that mean? Select one option.
   - ◯ Zach and the people have a telescope.
   - ◯ The people have a telescope.
   - ● **Zach was using a telescope.**
   - ◯ None of the above options are correct.

   Solution: ’From’ and ’to’ were the reverse of what I intended in this question. I gave full cried to either the third or fourth options.

4. (1 mark) Which of the following are true of the Viterbi algorithm? Select all true statements.
   - ■ **It is not compatible with models that consider the entire output sequence at once.**
   - □ It cannot be used with a neural network model.
   - ■ **The standard version has a time complexity of** $O(|words| * |labels|^2)$
   - □ When the algorithm is halfway through, it can tell you what the first half of the output will be.

5. (1 mark) Using the lines below, implement one step of Beam search. `beam` contains the current beam. `k` is the intended beam size. `token` is the current token. Provide your answer by filling in one circle in each row of the grid below.

```
1  for label in labels:
2  new_beam.sort(reverse=True)
3  new_beam.sort()
4  option = item + [label]
5  new_beam = []
6  score = get_score(option)
7  score = get_score(token)
8  score = get_score(token, option)
9  beam = new_beam
10 beam = new_beam[:k]
11 for option in labels:
12 for score, item in beam:
13 new_beam.append((score, option))
14 new_beam.append(score)
15 new_beam.append(option)
```

   Solution: Solutions, where numbers in square brackets means those rows could occur in any order:

- 5, [1, 12], 4, 8, 13, 2, 10

Note: In the original quiz there were some typos that have been fixed in this version.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○