Name:		SID:	

COMP 4446 / 5046 Quiz 3 (week 8) - version A

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) How are self-attention and cross-attention the same? Select all true statements.

   ☐ The way the output is used.
   ■ **The way the weights (α) are used.**
   ☐ The source of the keys, values, and queries.
   ■ **The similarity calculation.**

2. (1 mark) What is the purpose of RoPE? Select all true statements.

   ☐ To introduce a non-linear step in the self-attention process.
   ☐ To give flexibility in which parts of the vectors are used in each step.
   ☐ To make learning easier by making it easier for gradients to propagate.
   ■ **To enable self-attention to account for the position of a word in the input.**

3. (1 mark) Why is the output of the encoder passed into every step of the decoder? Select all true statements.

   ☐ To enable parallel processing in the decoder.
   ☐ To make the dimensionality of inputs to the cell match at all steps.
   ■ **To help the model not produce output that diverges too much from the original input.**
   ☐ To help the model not produce output that is completely different from the true answer.
   ☐ To improve the speed of training.

   > **Solution:** The last two options could also be included. The third option must be selected.

4. (1 mark) Which of these parts of the transformer help make training smoother? Select all true statements.

   ■ **Residual connections**
   ■ **Layer normalisation**
   ☐ Positional encoding
   ☐ Feedforward layers
   ☐ Self-attention

5. (1 mark) Using the lines below, implement code that uses spaCy to count occurrences of organisations in a provided string `text`. Provide your answer by writing the line numbers in the boxes to the right, in order, top to bottom.

```
 1  for token in doc:
 2  for ent in doc.ents:
 3  doc = nlp.entities(text)
 4  doc = spaCy(text)
 5  doc = nlp(text)
 6  nlp = spacy.load("en_core_web_sm")
 7  counts = {}
 8  if ent.label_ == "ORG":
 9  if token.ent == "ORG":
10  counts[token] = counts.get(token, 0) + 1
11  counts[ent.text] = counts.get(ent.text, 0) + 1
```

Solution: 6, 5, 7 (could also be earlier), 2, 8, 11