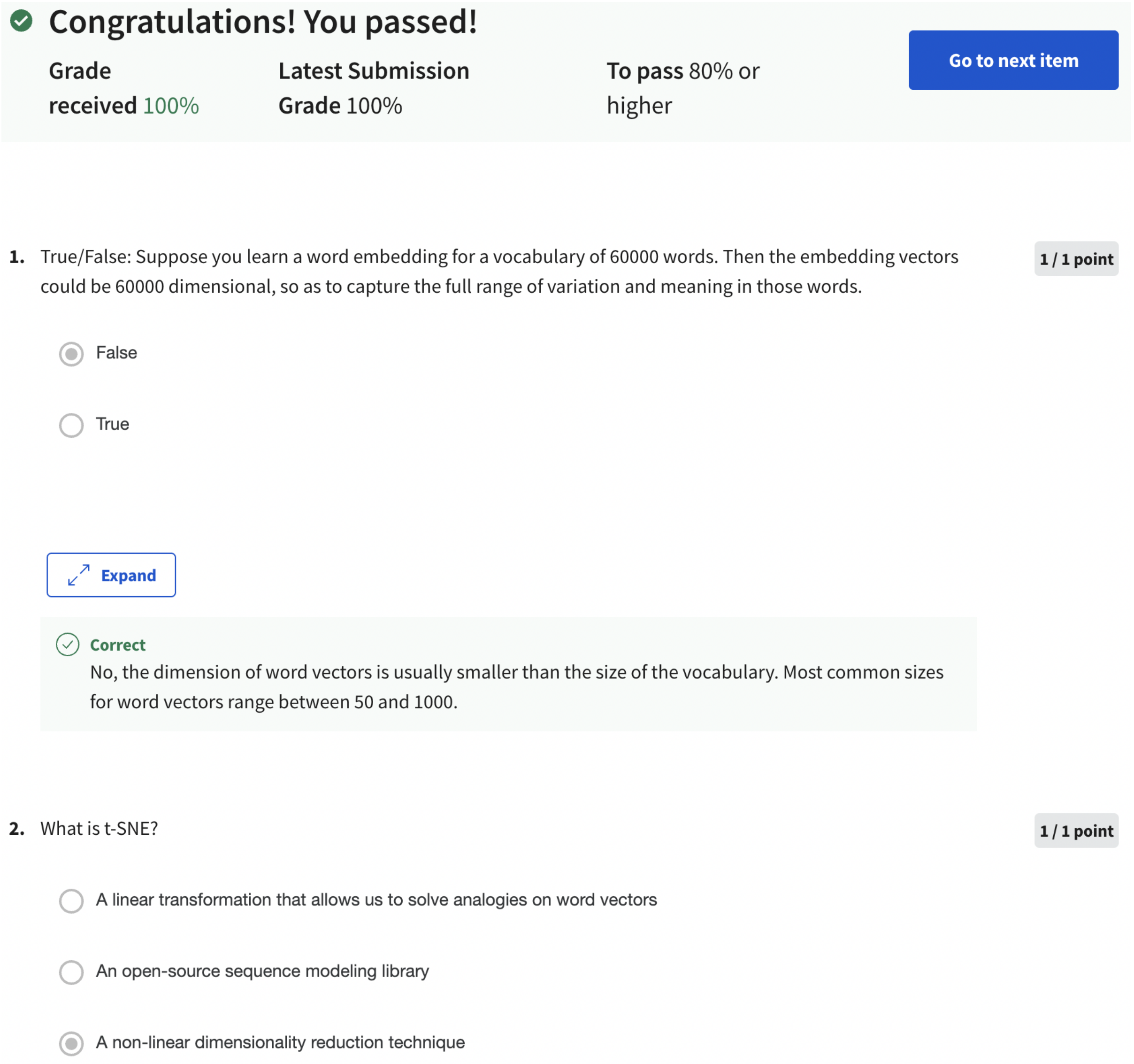
Natural Language Processing & Word Embeddings



Congratulations! You passed!

Grade received 100%

Latest Submission Grade 100%

To pass 80% or higher

1. True/False: Suppose you learn a word embedding for a vocabulary of 60000 words. Then the embedding vectors could be 60000 dimensional, so as to capture the full range of variation and meaning in those words.

1 / 1 point

● False

○ True

Correct

No, the dimension of word vectors is usually smaller than the size of the vocabulary. Most common sizes for word vectors range between 50 and 1000.

2. What is t-SNE?

1 / 1 point

○ A linear transformation that allows us to solve analogies on word vectors

○ An open-source sequence modeling library

● A non-linear dimensionality reduction technique

○ A supervised learning algorithm for learning word embeddings

Expand

✓ **Correct**

Yes

3. Suppose you download a pre-trained word embedding which has been trained on a huge corpus of text. You then use this word embedding to train an RNN for a language task of recognizing if someone is happy from a short snippet of text, using a small training set.

1 / 1 point

x (input text)	y (happy?)
I'm feeling wonderful today!	1
I'm bummed that my cat is ill.	0
Really enjoying this!	1

True/False: Then even if the word “upset” does not appear in your small training set, your RNN might reasonably be expected to recognize “I’m upset” as deserving a label y = 0.

● True

○ False

Expand

✓ **Correct**

Yes, word vectors empower your model with an incredible ability to generalize. The vector for “upset” would contain a negative/unhappy connotation which will probably make your model classify the sentence as a "0”.

4. Which of these equations do you think should hold for a good word embedding? (Check all that apply)

1 / 1 point

☑ $e_{boy} - e_{brother} \approx e_{girl} - e_{sister}$

✓ **Correct**

Yes!

□ $e_{boy} - e_{girl} \approx e_{sister} - e_{brother}$

□ $e_{boy} - e_{brother} \approx e_{sister} - e_{girl}$

☑ $e_{boy} - e_{girl} \approx e_{brother} - e_{sister}$

✓ **Correct**

Yes!

Expand

✓ **Correct**

Great, you got all the right answers.

5. True/False: The most computationally efficient formula for Python to get the embedding of word 1021, if C is an embedding matrix, and o_{1021} is a one-hot vector corresponding to word 1021, is $C^T * o_{1021}$.

1 / 1 point

● False

○ True

Expand

✓ Correct

It is computationally wasteful because the element-wise multiplication will be extremely inefficient.

6. When learning word embeddings, we pick a given word and try to predict its surrounding words or vice versa. **1 / 1 point**

● True

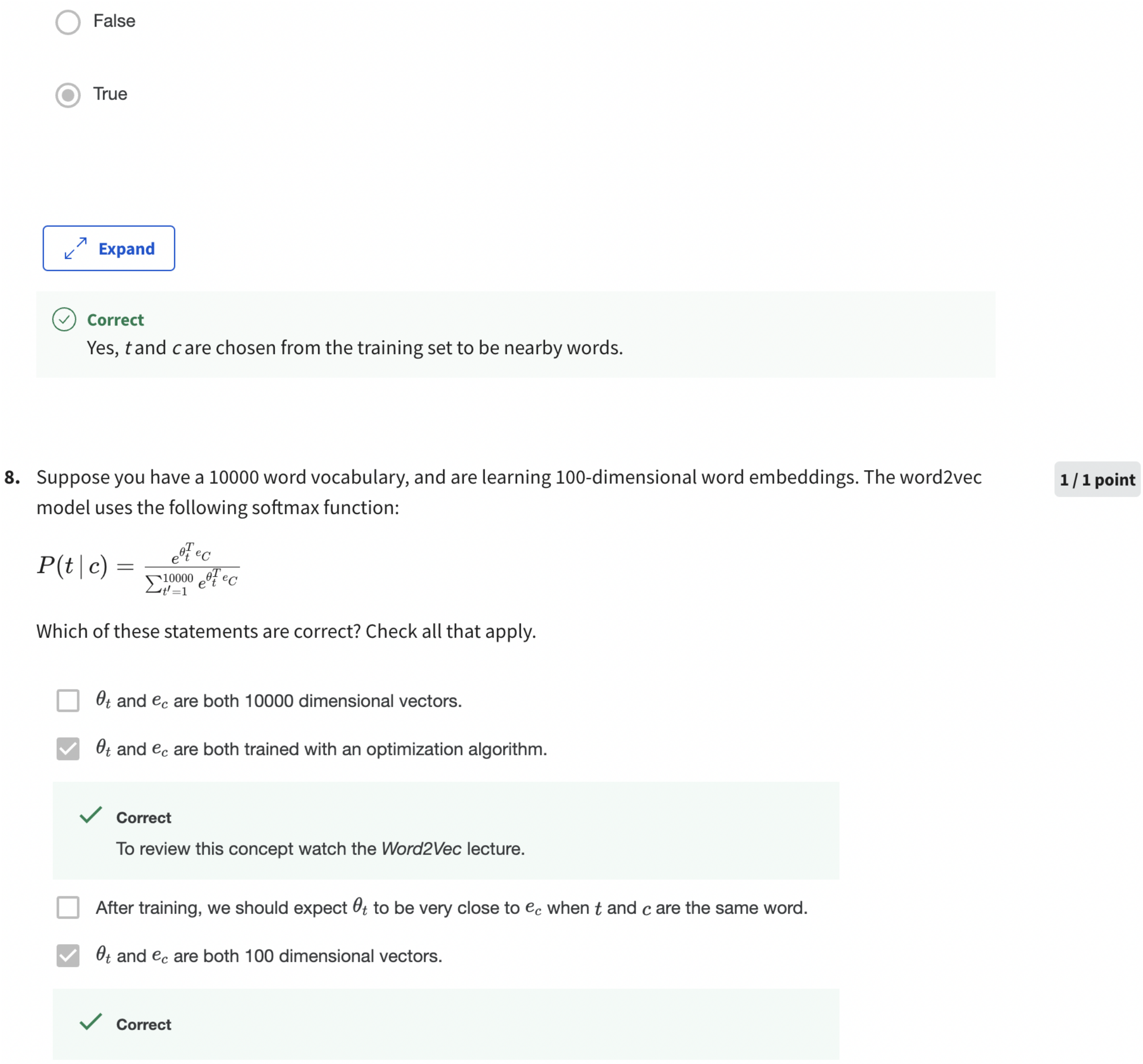
○ False

Expand

✓ Correct

Word embeddings are learned by picking a given word and trying to predict its surrounding words or vice versa.

7. True/False: In the word2vec algorithm, you estimate *P(t | c)*, where *t* is the target word and *c* is a context word. *t* and *c* are chosen from the training set to be nearby words. **1 / 1 point**



○ False

● True

Correct
Yes, t and c are chosen from the training set to be nearby words.

8. Suppose you have a 10000 word vocabulary, and are learning 100-dimensional word embeddings. The word2vec model uses the following softmax function:

$$P(t \mid c) = \frac{e^{\theta_t^T e_C}}{\sum_{t'=1}^{10000} e^{\theta_t^T e_C}}$$

Which of these statements are correct? Check all that apply.

□ θ_t and e_c are both 10000 dimensional vectors.

☑ θ_t and e_c are both trained with an optimization algorithm.

✓ Correct
To review this concept watch the *Word2Vec* lecture.

□ After training, we should expect θ_t to be very close to e_c when t and c are the same word.

☑ θ_t and e_c are both 100 dimensional vectors.

✓ Correct

Expand

✓ **Correct**

Great, you got all the right answers.

9. Suppose you have a 10000 word vocabulary, and are learning 500-dimensional word embeddings. The GloVe model minimizes this objective:

1 / 1 point

$$\min \sum_{i=1}^{10,000} \sum_{j=1}^{10,000} f(X_{ij})(\theta_i^T e_j + b_i + b_j\text{'} - log X_{ij})^2$$

True/False: X_{ij} is the number of times word j appears in the context of word i.

● True

○ False

Expand

✓ **Correct**

X_{ij} is the number of times word j appears in the context of word i.

10. You have trained word embeddings using a text dataset of m_1 words. You are considering using these word embeddings for a language task, for which you have a separate labeled dataset of m_2 words. Keeping in mind that using word embeddings is a form of transfer learning, under which of these circumstances would you expect the word embeddings to be helpful?

1 / 1 point

● $m_1 >> m_2$

○ $m_1 << m_2$

Expand

✓ **Correct**