CSSE 315 – Natural Language Processing
Rose-Hulman Institute of Technology

Exam 2 Review

Name (Print):_____   Date:_____

1   Speech, Phonetics, ASR

1. **True/False:** Phonemes are the smallest units of sound in a language that can distinguish words.

2. **Multiple Choice:** Which of the following is NOT a feature of phonetics (select one)?

    (a) Acoustic properties of speech

    (b) Articulatory mechanisms

    (c) Meaning of words

    (d) Perception of speech sounds

3. **Multiple Choice:** What type of graphic is typically used in phonetic analysis?

    (a) spectrogram

    (b) dendrogram

    (c) scatterplot

    (d) X-Rays

4. **True/False:** Automatic Speech Recognition (ASR) converts spoken language into written text using statistical and machine learning models.

5. **Multiple Choice:** What type of frequency measurement is commonly used in acoustic analysis?

    (a) Hertz (Hz)

    (b) Bytes per second

    (c) Frames per second

    (d) Words per minute

6. Write the word represented by the IPA symbols: [ɛkspləneɪʃən]

2   Prompt Logic Frameworks

7. **True/False:** The ReAct framework combines reflection and retrieval-based prompts for better task completion.

8. **Multiple Choice:** Chain of Thought (CoT) prompting is used to:

(a) Improve tokenization

(b) Enhance logical reasoning in LLMs

(c) Reduce model size

(d) Improve dataset labeling

9. **True/False:** Tree of Thoughts (ToT) extends CoT by structuring reasoning into multiple branching paths.

10. In the ReAct framework, what is the correct sequence of reasoning and interaction steps used to guide an AI agent's decision-making process?

(a) Observation → Thought → Action

(b) Thought → Action → Observation

(c) Action → Observation → Thought

(d) Thought → Observation → Action

3 AI Agent Frameworks, Functions, and Extensions

11. **True/False:** AI agent frameworks define how autonomous systems interact with the external world.

12. **Multiple Choice:** What is the primary advantage of function calling in AI agents?

(a) Enables AI models to execute API functions

(b) Increases training speed

(c) Limits token usage

(d) Improves dataset quality

13. **True/False:** AI agents cannot extend their capabilities beyond their pre-trained models.

4 NLP and society

14. **Multiple Choice:** Which of the following best describes allocative harm in AI systems?

(a) AI systems reinforce stereotypes in text-based outputs

(b) A credit-scoring AI system disproportionately denies loans to specific ethnic groups

(c) AI models require large datasets to function effectively

(d) AI-generated outputs tend to be verbose

15. **Multiple Choice:** Which of the following is an example of association bias?

(a) A credit-scoring AI system disproportionately denies loans to specific ethnic groups

(b) A translation model consistently translates "doctor" as male and "nurse" as female

(c) A recommendation system personalizes ads based on user preferences

(d) A chatbot retrieves relevant search results for a given input

16. **Multiple Choice:** What is a key concern about AI's environmental impact?

    (a) AI systems do not require physical infrastructure

    (b) Training large AI models requires significant energy consumption

    (c) AI models reduce the need for data storage

    (d) AI models eliminate carbon emissions

17. **Multiple Choice:** What is the primary function of data centers in AI applications?

    (a) Processing and storing vast amounts of AI training data

    (b) Generating synthetic training datasets for models

    (c) Replacing transformer architectures with alternative frameworks

    (d) Reducing computational efficiency in AI training

5   NLP Biases and Debiasing Techniques

18. **True/False:** Bias in NLP models can originate from both training data and model architecture.

19. **Multiple Choice:** The Word Embedding Association Test (WEAT) is used to measure:

    (a) Training efficiency

    (b) Model accuracy

    (c) Bias in word embeddings

    (d) Data augmentation quality

20. **Fill in the Blank:** _____ debiasing method alters word embeddings to reduce bias while preserving semantic relationships.

21. **True/False:** Contextualized word embeddings (e.g., BERT) eliminate all forms of bias present in language models.

22. **Multiple Choice:** Counterfactual Data Augmentation (CDA) is used to:

    (a) Improve model performance on unseen data

    (b) Reduce gender and racial bias in datasets

    (c) Increase model efficiency

    (d) Detect outliers in training data