Quiz MCQ – Final Assessment

Course: Full Stack AI B 4 SAT,SUN) 10 AM TO 12 PM
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NumPy — 5 MCQs

1. What is the default data type of np.array([1, 2, 3])?

- A) float64
- B) int32 or int64 depending on platform
- C) object
- D) int8

1. Which operation broadcasts correctly?

```
import numpy as np
a = np.ones((3,1))
b = np.arange(3)
```

- A) a + b
- B) a + b.reshape(1,3)
- C) Both A and B
- D) Neither

1. What does np.ravel() return?

- A) A new flattened array (always a copy)
- B) A flattened view if possible, otherwise a copy
- C) A list
- D) A 2D array

1. What is the result of:

```
x = np.array([0, 1, 2, 3])
x[[True, False, True, False]]
```

- A) [0, 2]
- B) [1, 3]
- C) [0, 1, 2, 3]
- D) Error

1. Which creates a 2D array of shape (2, 3) filled with 7?

- A) np.full(2, 7, shape=(2,3))
- B) np.full((2,3), 7)
- C) np.fill((2,3), 7)
- D) np.ones((2,3))*7.0

Python — Lists — 5 MCQs

1. What is the result of:

```
lst = [1, 2, 3]
lst.append([4,5])
lst
```

- A) [1,2,3,4,5]
- B) [1,2,3,[4,5]]
- C) Error
- D) [1,2,3]

1. Which creates a shallow copy of a list?

- A) lst.copy()
- B) lst[:]
- C) list(lst)
- D) All of the above

1. Result of:

```
a = [1,2]
b = a
b.append(3)
a
```

- A) [1,2]
- B) [1,2,3]
- C) Error
- D) [3]

1. Which removes the first occurrence of value 2?

- A) lst.pop(2)
- B) lst.remove(2)
- C) del lst[2]

- D) lst.clear()

1. What does sorted([3, 1, 2]) return?

- A) [3,2,1]
- B) [1,2,3]
- C) None
- D) In-place sort

Python — Tuples — 5 MCQs

1. Which is a valid single-element tuple?

- A) (1)
- B) (1,)
- C) tuple(1)
- D) 1,()

1. What is true about tuples?

- A) They are mutable
- B) They are immutable
- C) They cannot contain mutable items
- D) They are ordered randomly

1. Result of:

```
t = (1, [2,3])
t[1].append(4)
t
```

- A) (1, [2,3])
- B) (1, [2,3,4])
- C) Error
- D) (1, [4])

1. Which converts a list to a tuple?

- A) tuple([1,2,3])
- B) (1,2,3,)
- C) list((1,2,3))

- D) tuple(1,2,3)

1. What does tuple unpacking require?

- A) Same number of variables and tuple items
- B) Only one variable
- C) Names must match
- D) Variables must be strings

Python — Sets — 5 MCQs

1. What is the result of set([1,2,2,3])?

- A) {1,2,2,3}
- B) {1,2,3}
- C) [1,2,3]
- D) Error

1. Which operation computes intersection?

- A) a | b
- B) a - b
- C) a & b
- D) a ^ b

1. Which structure is unhashable and cannot be added to a set?

- A) int
- B) str
- C) tuple
- D) list

1. Result of:

```
1  s = {1,2}
2  s.add(2)
3  s
```

- A) {1,2}
- B) {1,2,2}
- C) {2}
- D) Error

1. Symmetric difference of {1,2,3} and {3,4} is:

- A) {1,2,3,4}
- B) {3}
- C) {1,2,4}
- D) {1,2}

Python — Dictionaries — 5 MCQs

1. Which retrieves a value safely with a default?

- A) d['key']
- B) d.get('key', default)
- C) d.pop('key', default)
- D) d.setdefault('key', default)

1. What happens in:

```
d = {'a':1, 'b':2}
d.update({'b':3, 'c':4})
```

- A) Error
- B) {'a':1, 'b':2, 'c':4}
- C) {'a':1, 'b':3, 'c':4}
- D) {'a':1}

1. Which iterates keys and values?

- A) for k in d:
- B) for k,v in d.items():
- C) for v in d.values():
- D) for k in d.keys():

1. What does dict.setdefault('x', []) do?

- A) Always overwrite 'x' with []
- B) Return value for 'x', create and set [] if missing
- C) Remove 'x'
- D) Throws KeyError if 'x' missing

1. Are dicts ordered?

- A) Never
- B) Only in Python 3.7+ insertion order is preserved
- C) Randomly ordered
- D) Ordered by key

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pandas — 5 MCQs

1. Which reads a CSV into a DataFrame?

- A) pd.read_csv('file.csv')
- B) pd.DataFrame('file.csv')
- C) pd.load('file.csv')
- D) pd.read('file.csv')

1. What does df.loc[2, 'col'] select?

- A) Integer position 2 and column index 0
- B) Label 2 for index and column 'col'
- C) Slice rows up to 2
- D) All rows, column 'col'

1. Which drops NA rows?

- A) df.dropna()
- B) df.fillna(0)
- C) df.isna()
- D) df.notna()

1. What does df.groupby('A')['B'].mean() return?

- A) A single scalar
- B) Series with mean of B per group in A
- C) DataFrame with all columns
- D) Error

1. How to create a new column as sum of two columns?

- A) df['C'] = df.sum(axis=1)
- B) df['C'] = df['A'] + df['B']
- C) df['C'] = df.apply(sum)

- D) df['C'] = df['A'].sum() + df['B'].sum()

Seaborn — 5 MCQs

1. Which draws a scatterplot with hue by category?

```
import seaborn as sns
```

- A) sns.lineplot(data=df, x='x', y='y', hue='cat')
- B) sns.scatterplot(data=df, x='x', y='y', hue='cat')
- C) sns.catplot(data=df, kind='bar', x='x', y='y')
- D) sns.histplot(data=df, x='x', hue='cat')

1. Which function gives high-level faceting by a categorical variable?

- A) sns.FacetGrid
- B) sns.PairGrid
- C) sns.catplot
- D) sns.clustermap

1. Which palette argument is valid?

- A) palette='viridis'
- B) palette='Set2'
- C) palette=['#1f77b4','#ff7f0e']
- D) All of the above

1. What does sns.heatmap(df.corr(), annot=True) do?

- A) Plots kernel density
- B) Plots correlation matrix with text annotations
- C) Plots pairwise scatter plots
- D) Plots bar chart

1. Which function draws distributions (univariate) with optional KDE?

- A) sns.displot
- B) sns.histplot
- C) sns.kdeplot
- D) All can be used

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scikit-learn — 10 MCQs

1. What does train_test_split(X, y, test_size=0.2, random_state=42) do?

- A) Splits data; 20% test; reproducible split
- B) Splits features only
- C) Fits a model
- D) Normalizes data

1. Which is a valid pipeline?

```
from sklearn.pipeline import Pipeline
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
pipe = Pipeline([
  ('scaler', StandardScaler()),
  ('clf', LogisticRegression())
])
```

- A) Valid; transforms then fit classifier
- B) Invalid; scalers cannot be used in pipeline
- C) Invalid order
- D) Pipelines require 3 steps

1. Which computes cross-validation scores?

- A) GridSearchCV
- B) cross_val_score
- C) KMeans
- D) PCA

1. In scikit-learn, how do you ensure reproducibility for random algorithms?

- A) Set max_iter
- B) Set random_state
- C) Set n_jobs
- D) Set tol

1. What does OneHotEncoder(handle_unknown='ignore') do?

- A) Raises error on unseen categories
- B) Drops all unknown rows
- C) Produces zeros for unknown categories

- D) Fills NaNs with mode

1. What is ColumnTransformer used for?

- A) Combine multiple column-specific transformations
- B) Select top features
- C) Train multiple models
- D) Plot correlations

1. Which estimator is unsupervised?

- A) RandomForestClassifier
- B) LinearRegression
- C) KMeans
- D) SVC

1. What does StandardScaler do?

- A) Scales features to [0,1]
- B) Centers to mean 0 and scales to unit variance
- C) Normalizes rows to unit norm
- D) Binarizes features

1. Best way to avoid data leakage when preprocessing + model training?

- A) Fit scaler on full dataset, then split
- B) Use Pipeline so transforms fit on training only
- C) Shuffle test labels
- D) Drop NA values from test only

1. Which metric is suitable for imbalanced binary classification?

- A) Accuracy
- B) MSE
- C) ROC-AUC or F1-score
- D) R^2

TensorFlow / Keras — 10 MCQs

1. In Keras Sequential, the input_shape excludes:

- A) Feature dimension

- B) Batch size
- C) Last layer size
- D) Number of classes

1. Correct binary classification compile?

```
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
```

- A) Correct
- B) Must use 'categorical_crossentropy'
- C) Must use 'mse'
- D) Metrics not allowed

1. What does model.fit(X, y, epochs=10, validation_split=0.2) do?

- A) Uses 20% of training data as validation
- B) Requires separate validation set
- C) Trains for 20 epochs
- D) Freezes layers

1. Which callback helps prevent overfitting?

- A) EarlyStopping
- B) ModelCheckpoint
- C) ReduceLROnPlateau
- D) All can help; EarlyStopping directly stops training

1. Output shape of:

```
model = tf.keras.Sequential([
  tf.keras.layers.Dense(16, activation='relu', input_shape=(10,)),
  tf.keras.layers.Dense(1, activation='sigmoid')
])
```

- A) (None, 16)
- B) (None, 1)
- C) (None, 10)
- D) (1,)

1. In functional API, merging branches is done with:

- A) tf.concat only
- B) tf.keras.layers.Concatenate()

- C) tf.add only
- D) tf.keras.layers.Merge() (deprecated)

1. For multi-class classification with one-hot labels:

- A) Use softmax + categorical_crossentropy
- B) Use sigmoid + binary_crossentropy
- C) Use linear + mse
- D) Use relu + hinge

1. How to freeze layers for transfer learning?

- A) layer.trainable = False then re-compile
- B) layer.active = False
- C) model.freeze()
- D) Not supported

1. What does tf.data.Dataset.from_tensor_slices((X, y)).batch(32) create?

- A) A generator for custom training loops only
- B) A batched dataset usable with model.fit
- C) A NumPy array
- D) A Keras layer

1. When using sparse_categorical_crossentropy, labels should be:

- A) One-hot encoded
- B) Integer class indices
- C) Floats in [0,1]
- D) Strings

LangChain / LLM — 5 MCQs

1. What does PromptTemplate do in LangChain?

- A) Stores embeddings
- B) Structure and format prompts with variables
- C) Train LLMs
- D) Vectorize documents

1. What are “Tools” in an Agent?

- A) Pretrained models
- B) Functions/APIs the agent can call (e.g., search, calculator)
- C) Memory modules
- D) Datasets

1. What is a common way to enable retrieval-augmented generation (RAG)?

- A) LLMChain only
- B) Use a VectorStore + Retriever to fetch relevant docs for the prompt
- C) Finetune the base LLM
- D) Use TextSplitter alone

1. What does ConversationBufferMemory do?

- A) Stores embeddings in FAISS
- B) Maintains chat history and injects it into the prompt
- C) Schedules agent runs
- D) Clears memory each turn

1. Why use Callbacks (LangChain) during runs?

- A) To manipulate optimizer
- B) To observe/stream intermediate steps/tokens for logging or UX
- C) To create databases
- D) To cache prompts only