Final

⚠ This is a preview of the published version of the quiz

Started: Sep 20 at 9:17pm

Quiz Instructions

Final

Date & Time:

- Regular: 10:00AM - 12:15PM, Thu, Aug 10th
- Conflict: 3:00PM - 5:15PM, Thu, Aug 10th

Exam Format:

- 120 minutes for the exam + 15 minutes for starting Honorlock
- 30 multiple choice questions
  - 15 MCQs on Part 1: Performance and Part 2: Web and Visualization
  - 15 MCQs on Part 3: Machine Learning (Parallelism inclusive)
- Here's a list of learning objectives corresponding to each topic: **https://github.com/yiyins2/CS320-SU23-lecture-notes/blob/main/exams/learning%20objectives.pdf (https://github.com/yiyins2/CS320-SU23-lecture-notes/blob/main/exams/learning%20objectives.pdf)**
- The questions will focus more on lectures and quizzes, and less on labs and projects
- Here're some past exams, and the midterm will be in a similar style: **https://github.com/yiyins2/CS320-SU23-lecture-notes/tree/main/exams (https://github.com/yiyins2/CS320-SU23-lecture-notes/tree/main/exams)**
- Feel free to post questions about past exams on Piazza with the semester number and question number as the title

How to take the exam?

- Five minutes before the exam, I will send you the access code through email
- You can find the exam under Canvas - Quizzes
- Here's an online tutorial going through the details on how to use Honorlock: **https://honorlock.com/wp-content/uploads/2019/09/Canvas_Student_Guide_Accessible.pdf (https://honorlock.com/wp-content/uploads/2019/09/Canvas_Student_Guide_Accessible.pdf)**
- You need to scan your Photo ID (e.g., Student ID)
- You can bring **TWO** double-sided page of notes (8.5x11). Feel free to collaborate with other students on creating your note sheet.
- You can also bring any number of empty scratch papers

- No other computers/smart devices other than the one you are using to take the exam are allowed
- As you cannot ask for clarifications during the exam, please answer all questions to the best of your knowledge. You can email me about questions on the exam after the fact.

Cheating

- Please DO NOT discuss about exam questions or post about them on Piazza before Sun, Aug 13th, as I have conflict exams scheduled before then. Email me if you have any questions.

Illness

- If you fall sick right before the exam, please email me immediately
- I'll expect medical documents (doctor's note, test result, etc) within 3 days after the final
- I'll weigh your final using the two midterm (the grade of the final will be the average of the two midterms)

Question 1 — 1 pts

Which of the following **CANNOT** be pointed by a git head?

- ◯ commit
- ◯ branch
- ◯ tag

Question 2 — 1 pts

What does the following code snippet print?

```
def magic(n):
    if n <= 0:
        return 0
    return magic(n - 1) + 2 * magic(n - 2) + 1

print(magic(3))
```

- ◯ 6

- ◯ 3
- ◯ 5
- ◯ 4

Question 3

1 pts

Given that `array` is an array with `N` elements. What is the complexity of the following code snippet?

```
from collections import deque
dq = deque([])
idx = 0
for elem in array:
    if idx % 2 == 0:
        dq.appendLeft(elem)
    else:
        dq.append(elem)
    idx += 1
```

- ◯ O(N log N)
- ◯ O(N^2)
- ◯ O(log N)
- ◯ O(N)

Question 4

1 pts

Which of the following special methods can be used to print an object in a user friendly format?

- ◯ __repr__
- ◯ _repr_html
- ◯ __str__

Question 5

1 pts

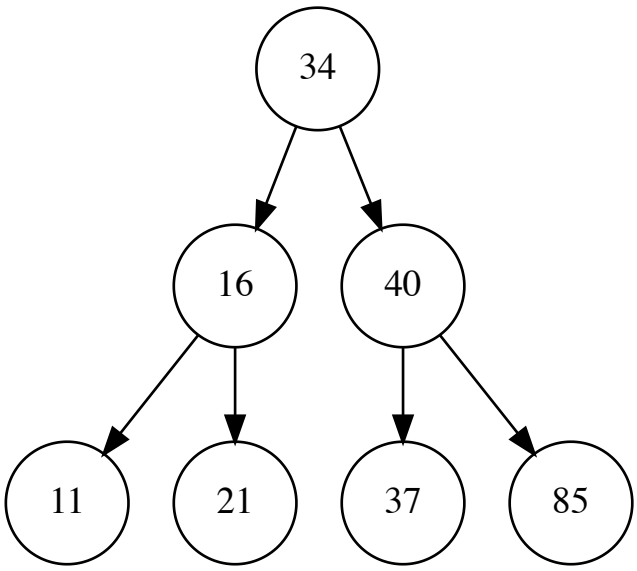
Assume `obj` is an instance of some class and the method call `obj.magic("final", 320)` succeeds. Which of the following might be the definition line of `magic`?

- ◯ def magic(self, a)
- ◯ def magic(a, b, c, d="yeah"):
- ◯ def magic(a, b):
- ◯ def magic(self, a, b, c)

Question 6

1 pts

Consider the BST insertion algorithm we learned in class. Given the below BST, which of the following **CANNOT** be the insertion order?



- ◯ [34, 40, 85, 16, 21, 11, 37]
- ◯ [34, 16, 11, 40, 85, 21, 37]

- ○ [34, 40, 85, 21, 16, 11, 37]
- ○ [34, 40, 16, 37, 21, 11, 85]

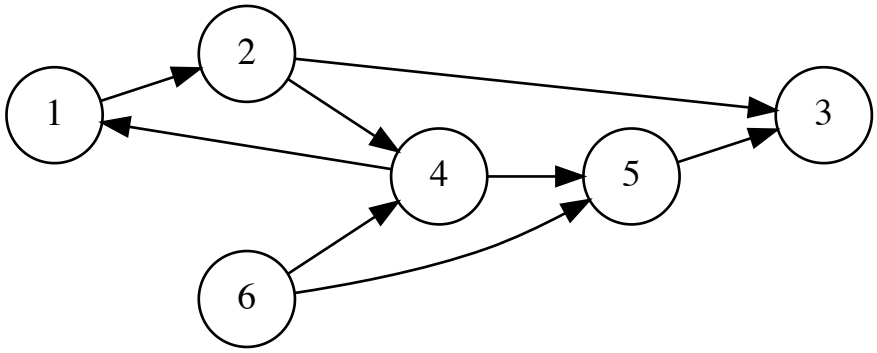
Question 7

1 pts

Given the following directed graph. What would be the **visit order** of a **Breadth-First-Search** starting at node 4?

The search stops when it can't reach nodes that haven't been visited.

If there are multiple neighbors, the neighbor with the smaller number will be visited first.



- ○ 4,1,2,5,3
- ○ 4,1,2,3,6,5
- ○ 4,1,5,2,3,6
- ○ 4,1,5,2,3

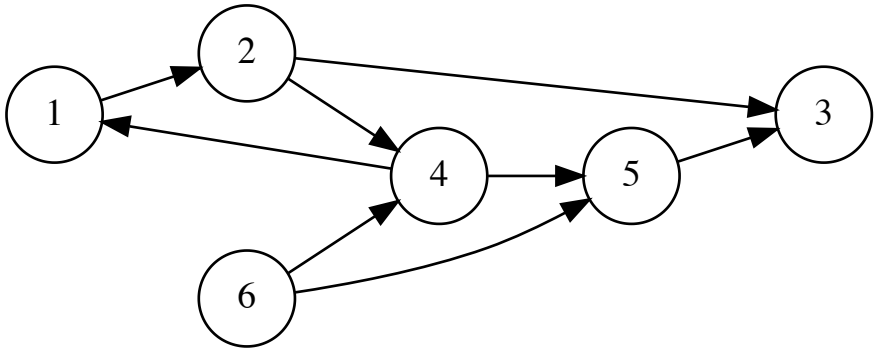
Question 8

1 pts

Given the following **directed** graph. What would be the **visit order** of a **Depth-First-Search** starting at node 4?

The search stops when it can't reach nodes that haven't been visited.

If there are multiple neighbors, the neighbor with the smaller number will be visited first.



- ◯ 4,1,2,3,5,6
- ◯ 4,1,2,3,5
- ◯ 4,1,2,5,3,6
- ◯ 4,1,5,2,3

Question 9

1 pts

If a flask app has the following routes, what does the app print when a user visits `project.html` of the site? Assume that the client is using a standard browser and the client has never visited this site before.

```
@app.route("/")
def root():
    print("A")
    return "<html><body>Welcome to my website!</body></html>"

@app.route("/graph.svg")
def image():
    print("B")
    return "Not drawn yet"

@app.route("/project.html")
def awesome():
    print("C")
    return "<html><body>This is my graph: <img src="graph.svg"> </body></html>"
```

- ◯ A, C, and B
- ◯ C and B

- ◯ C only
- ◯ A and C

Question 10

1 pts

	Click	No-Click
Version A	80	20
Version B	40	60

Given the above table, what is the click-through rate of version A?

- ◯ 0.6
- ◯ 0.4
- ◯ 0.8
- ◯ 0.2

Question 11

1 pts

Assume `element` is a Selenium WebElement. Which of the following enables us to access the text of `element`?

- ◯ element.get_attribute("text")
- ◯ element.attributes["text"]
- ◯ element.text
- ◯ element.attributes.get("text")

Question 12

1 pts

```
text = "10:00PM - 12:15PM"
matches = re.findall("((\d+):(\d+)\s*(AM|PM))", text)
```

What is `len(matches[-1])`?

- ○ 2
- ○ 5
- ○ 4
- ○ 1
- ○ 3
- ○ 6

Question 13

1 pts

What will be returned by `re.sub("group_(\d)_row_(\d)", "row_\g<2>_col_\g<1>", "table_group_7_row_234")`?

- ○ "table_row_2_col_734"
- ○ "table_row_7_col_234"
- ○ "table_row_234_col_7"
- ○ "row_2_col_734"

Question 14

1 pts

Which of the following coordinate reference system allows me to have the most accurate results when calculating areas of countries?

- ◯ pixels
- ◯ degrees
- ◯ lat/long
- ◯ meters

Question 15

1 pts

Your figure has only one subplot. The xlim and ylim of the subplot are (0, 1.2) and (0, 1), respectively. You are drawing a circle that is located at (0.5, 0.5) and has radius of 0.2.

```
fig, ax = plt.subplots()
ax.set_xlim(0, 1.2)
ax.set_ylim(0, 1)
plt.Circle((0.5, 0.5), 0.2, transform=transformer)
```

Which of the following `transformer` will give your circle the largest area?

- ◯ `None`
- ◯ `fig.transFigure`
- ◯ `ax.transData`
- ◯ `ax.transAxes`

Question 16

1 pts

Which of the following is **NOT** in the column space of

```
[[2, 0 , 3],
 [0, -1, 0],
 [4, 0 , 6]]
```

```
[[5],
 [1],
 [-10]]
```

```
[[4],
 [-3],
 [8]]
```

```
[[0],
 [1234],
 [0]]
```

```
[[0],
 [0],
 [0]]
```

Question 17

1 pts

Numpy array `a` has the shape of (90, 20, 60) and numpy array `b` has the shape of (2, 10). How to reshape `b` so that it's possible to perform `a * b`?

```
b.reshape(1, 20)
```

```
b.reshape(-1, 20)
```

```
b.reshape(20)
```

```
b.reshape(20, -1)
```

Question 18

1 pts

When we compare two models using the same train sets by computing the cross validation scores, which of the following characteristics indicate a better model?

- ◯ large mean, large variance
- ◯ large mean, small variance
- ◯ small mean, small variance
- ◯ small mean, large variance

Question 19

1 pts

```
model = LinearRegression()
model.fit(train[xcols], train[ycol])
model.score(test[xcols], test[ycol])
```

Given the above linear regression model, what metric do we use in the third line to measure its performance?

- ◯ F1 score
- ◯ accuracy score
- ◯ explained variance score
- ◯ R^2 score

Question 20

1 pts

Assume `Feature 1` and `Feature 2` are categorical columns containing 4 categories and 2 categories, respectively. `Feature 3` is a numerical column. How many columns will be produced after we apply the following `custom_transformer`?

```
custom_transformer = make_column_transformer(
        (OneHotEncoder(), ["Feature 1", "Feature 2"]),
        (PolynomialFeatures(degree=2, include_bias=False), ["Feature 3"]),
```

```
)
```

- ◯ 8
- ◯ 6
- ◯ 7
- ◯ 9

Question 21

1 pts

```
matrix = array([[ 3, 99,  1],
                [27, 81,  5],
                [46, 57, 70]])
```

What's `matrix.argmax(axis=1)`?

- ◯ array([99, 81, 70])
- ◯ array([1, 1, 2])
- ◯ array([2, 0, 2])
- ◯ array([46, 99, 70])

Question 22

1 pts

Given the following confusion matrix, what is the precision for `Mocha`? The x-axis represents the model predictions and the y-axis represents the real labels.

	Cappuccino	Mocha	Latte
Cappuccino	40	10	0
Mocha	10	20	0
Latte	0	10	30

- ◯ 3/4
- ◯ 2/3
- ◯ 1/3
- ◯ 1/2

Question 23

1 pts

```
model = LogisticRegression(fit_intercept=False)
model.fit(train[xcols], train[ycol])
pred_y = model.predict(test[xcols])
X = test[xcols].values
c = model.coef_
```

Which of the following is the equivalent of the third line in the above code snippet?

- ◯ pred_y = sigmoid(X @ c)
- ◯ pred_y = X @ c > 0
- ◯ pred_y = X @ c
- ◯ pred_y = model.predict_prob(X @ c)

Question 24

1 pts

Which of the following transformation is always recommended for numerical columns of Logistic Regression models?

- ◯ OneHotEncoder
- ◯ PolynomialFeatures
- ◯ StandardScalar

Question 25

1 pts

Which of the following ML algorithm will produce a dendrogram?

- ◯ KMeans
- ◯ LogisticRegression
- ◯ PCA
- ◯ AgglomerativeClustering

Question 26

1 pts

Which of the following is the best for KMeans algorithm?

- ◯ small inertia, few clusters
- ◯ large inertia, few clusters
- ◯ large inertia, many clusters
- ◯ small inertia, many clusters

Question 27

1 pts

Given points [(7, 5), (6, 5), (1, 2), (5, 8)] and starting centroids [(7, 7), (2, 1)], what are the centroids after the first iteration of assigning points and updating centroids, using the iterative K-Means Clustering algorithm discussed in class?

- ◯ [(6.5, 5), (3, 5)]
- ◯ [(6, 6), (1, 2)]

- [(1, 2), (6, 6)]
- [(3, 5), (6.5, 5)]

Question 28

1 pts

The following is the `explained_variance_ratio_` of a PCA model. How many components do we need to explain 90% of the variance of the original data?

```
array([0.7, 0.15, 0.08, 0.04, 0.02, 0.01])
```

- 2
- 4
- 6
- 5
- 3
- 1

Question 29

1 pts

`df` has 15 columns and 200 rows. After applying `PCA(6)`, what is the shape of `p.components_`?

```
p = PCA(6)
p.fit(df)
```

- (6, 15)
- (6, 200)
- (200, 6)

- ◯ (15, 6)

Question 30

1 pts

Which of the following has its own address space?

- ◯ thread
- ◯ CPU
- ◯ process
- ◯ program

Not saved

Submit Quiz