

# CS 320 Exam 2 (14%) - Fall 2022

Instructor: Tyler Caraza-Harter

First/Given Name: \_\_\_\_\_. Last/Surname: \_\_\_\_\_

Net ID: \_\_\_\_\_@wisc.edu

Fill in these fields (left to right) on the scantron form (use pencil):

1. LAST NAME (surname) and FIRST NAME (given name), fill in bubbles
2. IDENTIFICATION NUMBER is your Campus ID number, fill in bubbles
3. Under A of SPECIAL CODES, write your lecture number, fill in bubbles. 1=8:50am, 2=11am
4. Under B of SPECIAL CODES, tell us about the nearest person (if any) to your left. 0=no person to the left in your row, 1=somebody you do not know is there, 2=somebody you do know is there.
5. Under C of SPECIAL CODES, do the same as B, but for the person to your right
6. **Under D of SPECIAL CODES, write 5 and fill in bubble 5.** This is very important!

Make sure you fill all the special codes above accurately in order to get graded.

You have 40 minutes to take the exam. Use a #2 pencil to mark all answers. When you're done, please hand in these sheets in addition to your filled-in scantron. You may not sit adjacent to your friends or other people you know in the class (having only one empty seat is considered "adjacent"). You may only reference your notesheet. You may not use books, your neighbors, calculators, or other electronic devices on this exam. Please place your student ID face up on your desk. Turn off and put away portable electronics now.

(Blank Page for You to Do Scratch Work)

**Q1. Does the following create a binary tree?**

```
A.left = B
A.right = C
B.right = D
C.left = D
```

(A) yes (B) no

**Q2. 10 people visit a website. 2 of these click on an advertisement and 8 do not. What is the CTR?**

(A) 1/5 (B) 1/4 (C) 4 (D) 5 (E) 0.8

**Q3. In the URL "http://PART1:PART2/PART3", what is PART2 for?**

(A) indicating which VM (B) indicating which resource (C) indicating which process (D) query string

**Q4. If `obj` is of type `C`, what does `obj.method(x, y)` do?**

(A) `C.method(x, y)`, (B) `C.method(obj)`, (C) `C.method(obj, x, y)` (D) `obj.method(obj, x, y)`

**Q5. If a Flask app has the following handlers, what does it print when a user visits the home page in a browser?**

```
@app.route("/")
def home():
    print("X")
    return '<html><body></body></html>'
@app.route("/plot.png")
def handler1():
    print("Y")
    return "TODO"
@app.route("/out.svg")
def g():
    print("Z")
    return "TODO"
```

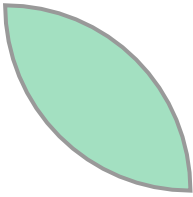
(A) X only (B) X and Y (C) X and Z (D) X, Y, and Z

**Q6. Does the regular expression `r"[A-Z].+?\d"` match anything in the string `"1cdbaB."`?**

(A) yes (B) no

**Q7. What could be added to the following code to produce the below shape?**

```
from shapely.geometry import box, Point
x = Point(0,0).buffer(1)
y = Point(1,1).buffer(1)
```



- (A) `x.union(y)`   (B) `x.intersection(y)`   (C) `x.difference(y)`   (D) `y.difference(x)`

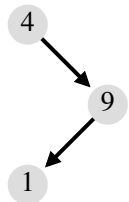
**Q8. How do you stage files for a git commit?**

- (A) `git add`   (B) `git branch`   (C) `git clone`   (D) `git prep`

**Q9. A piece of code loops N times. Inside the loop, it calls an O(N) function for each iteration. What is the complexity class of this piece of code?**

- (A)  $O(N)$    (B)  $O(N+N)$    (C)  $O(2N)$    (D)  $O(N^2)$

**Q10. Is this a BST? (infer left/right child based on arrow direction)**



- (A) yes   (B) no

**Q11. In shapely, what is the type of `Point(x,y).buffer(y)`?**

- (A) Point   (B) Buffer   (C) Circle   (D) Oval   (E) Polygon

**Q12. When is a stack frame created?**

- (A) when a function is defined  
(B) when a function is called  
(C) when a function returns

**Q13. What is *geocoding*?**

- (A) writing code that uses geopandas
- (B) mapping an (x,y) to a point on the earth
- (C) converting lat/lon to a meter-based CRS
- (D) mapping a street address to a coordinate
- (E) mapping a coordinate to a street address

**Q14. "Retry-After" is most often specified in the headers of a response with which status code?**

- (A) 100   (B) 200   (C) 404   (D) 429   (E) 500

**Q15. You have a DataFrame with numeric features and a categorical label. The label column has some missing values, and you want to guess what values should go there. What kind of problem is this?**

- (A) regression   (B) classification   (C) clustering   (D) decomposition

**Q16. What does an operating system do?**

- (A) manage resources
- (B) garbage collect unused objects
- (C) translate Python code to machine code
- (D) translate Java code to Python code

**Q17. In the following code analyzing a contingency table from an A/B test, pvalue is 0.022. The threshold for significance is 2.0%. Do we have statistically significant evidence that B has a different click-through-rate than A?**

```
from scipy import stats

df = pd.DataFrame({
    "click": {"A": ????, "B": ????,},
    "no-click": {"A": ????, "B": ????,},
})
_, pvalue = stats.fisher_exact(df)
```

- (A) yes   (B) no

**Q18. After `result = re.findall(????, ????)`, what is the type of `result`?**

- (A) always a string   (B) always a tuple   (C) always a list   (D) could be either a list or tuple

**Q19. You're worried version B of your A/B test might be terrible but still want to evaluate it. What should you do? Choose the best answer.**

- (A) do an A/A test
- (B) do a B/A test after switching to B
- (C) choose a lower significance threshold
- (D) start with 0% of B, then slowly increase

**Q20. A circle with alpha 1 is hidden beneath a triangle. If you want to see the circle, what could you do?**

- (A) increase alpha of the circle
- (B) increase zorder of the triangle
- (C) increase alpha of the triangle
- (D) decrease zorder of the circle
- (E) increase zorder of the circle