Name

## Python for Math and Stat Fall 2023 Exam 2

Assume that all necessary packages have been imported.

- 1. (20 pts) For the following 4 problems, write down what each code block would display if executed in a Jupyter cell. If the code generates an error or infinite loop, write Error.

  - (b) yr = 2023
    f'yr {yr/100:4.1f}'
  - (c) num = 123456789
    result = []
    while num % 10 > 5:

num //= 1000
result.append(num)
result

```
(d) def func(alist):
    print(alist, end=' ')
    if len(alist) == 1:
        return 10
    return func(alist[1:]) + 10
    func([6, 8, 2])
```

2. (10 pts) Write a function **diamonds** (n) that uses plt.fill() to display a row of n overlapping diamonds. Each diamond measures 2 units wide and 2 units high. The diamonds overlap by one unit. Use default settings for color and aspect ratio.

Example: diamonds (5) produces the following result.



3. (10 pts) Suppose randnums is a list of positive integers. We wish to count the number of occurrences of each distinct integer. Write code to create a dictionary called **freq** with keys corresponding to the distinct integers in randnums. Each dictionary value equals the number of occurrences of its key in randnums.

Example: If randnums = [65, 999, 4, 65, 8, 4], then the final value of freq will be  $\{65: 2, 999: 1, 4: 2, 8: 1\}$  with the entries in some order.

*Note:* The code should loop through randnums, incrementing the appropriate counter in freq. The code should not loop through the dictionary or use count (). It should create only the necessary key-value pairs.



4. (10 pts) For user accounts on the Buffers.com site, passwords must contain at least 6 characters with at least one letter and one digit. Write a function **is\_valid(passw)** that returns True if a user's password passw satisfies the requirements. It returns False otherwise. Assume that passw is a string.

Example: is\_valid('i8.cake') returns True and is\_valid('I ate pie') returns False. *Hint:* You may wish to use the .isalpha() and .isnumeric() methods which return True if a character is a letter or digit, respectively.



When done with the exam, please scan and upload your work to Gradescope, then hand in your test. Have a great weekend!

## ADDITIONAL BLANK SPACE If you write a solution here, please clearly <u>indicate the problem number</u>.

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