CS303e - Summer 2022 - Midterm

Name: _____ UTEID: _____

Problem Number	Topic	Points Possible	Points Off
1	Short Answer	50	
2	Create a Function	12	
3	Conditionals	12	
4	Random	13	
5	Loops	13	
TOTAL POINTS OFF:			
Extra Credit Answered:			
SCORE OUT OF 100:			

Instructions:
1. Please turn off or silence your mobile devices.
2. You have 2 hours to complete the test.
3. Place your final answers on this test, not scratch paper. Answers must be in pencil.
4. You may not use a calculator.
5. The exam is closed. Meaning you may not use ANY outside resources. No notes, no other websites, no other electronic devices, no books, no other person.
6. Follow the restrictions of the question. For example, if a question does not allow the use of lists, do not use any lists in your answer.
7. You may write additional functions to provide structure and remove redundancy.
8. The exam proctors will not answer questions regarding the content of the exam. If you believe a question has an error or is ambiguous, state your assumption and answer based on your assumption.
9. If you finish early bring your exam and scratch paper to the proctor and show them your UTID.

0. Extra Credit - 2 points. In the past year what movie, book, TV show, podcast, YouTube video, play, musical, or other creative work did you enjoy the most?

1. Short Answer 2 points each, 50 points total. Place you answer in the box to the right of the code. If the code results in a syntax error, answer **syntax error.** If the code results in a runtime error, answer **runtime error. For output show exactly what is output to the screen when the code is run. Assume any necessary imports have been made. Assume all client code is in the main function.**

A. What is output by the following code when it is run?
The floor function returns an integer, not a float.

```
x = -2.15
y = math.floor(x - 2)
print(y, end='')
```

> -5

B. What is output by the following code when it is run?

```
x = 5
y = x / 2
x += 1
print(x, y, end='')
```

> 6 2.5

C. What is output by the following code when it is run?

```
x = 3
y = 2
z = x ** y
x *= y + 1
print(x, z, end='')
```

> 9 9

D. What is output by the following code when it is run?

```
x = 19
y = 5
z = x // y + y % x
print(z, end='')
```

> 8

E. What is output by the following code when it is run?

```
x = 20
y = 3
z = 5
print(x % y, x % z, (z + y) % x, end='')
```

> 2 0 8

F. What is output by the following code when it is run?

```
x = 15
y = -1
x //= y + 4
print(x, end='')
```

G. What is output by the following code when it is run?

```
x = 13
y = 5
p = (x // y != 2) or (y >= x)
print(p, end='')
```

H. What is output by the following code when it is run?

```
st1 = 'CS'
st2 = 'cs'
p = (len(st1) == len(st2)) and (st1 != st2)
q = not p
print(p, q, end='')
```

I. What is output by the following code when it is run?

```
a = 0.5
x = 3
b = x * a
print(b, end='')
```

J. What is output by the following code when it is run?

```
st3 = 'Three'
y = int(st3) ** 2
print(y)
```

K. What is output by the following code when it is run?

```
x = 2.5
y = x - 1.5
z = 4 + x
x += 1
z -= 1
y = x + y + z
print(x, y, z, end='')
```

L. What is output by the following code when it is run?

```python
count = 0
limit = 30
x = 2
while x < limit:
    count += 1
    x *= 2
print(count, x, end='')
```

M. What is output by the following code when it is run?

```python
day = 'Mon'
if day == 'Tue' or 'Wed':
    print('A', end='')
else:
    print('B', end='')
```

N. What is output by the following code when it is run?

```python
total = 0
for i in range(0, 5):
    total += 1
print(total, end='')
```

O. What is output by the following code when it is run?

```python
total = 0
for x in range(1, 4):
    total += 1
    for j in range(3):
        total += x
print(total, end='')
```

P. What is output by the following code when it is run?

```python
x = 3
y = -2
if x >= y:
    x -= 2
    y += 2
if x >= 0:
    x -= 2
    y += 2
if x >= y:
    x -= 2
    y += 2
print(x, y, end='')
```

Q. Which of the following identifiers is not syntactically legal in Python?

```
range_for
AnD
16m
sample2
WHILE
```

R. What is output when the following client code is run?

```
def fun1(m):
    m *= 2
    print(m, end='')

# client code
x1 = 3
fun1(x1)
print(x, end='')
```

S. What is output when the following client code is run?

```
def fun2(x, y):
    x = 4
    y = x + y
    print(x, y, end=' ')

# client code
x1 = 2
fun2(x1, x1)
print(x1, end='')
```

T. What is output when the following client code is run?

```
def fun3(a, b):
    a -= 2
    b *= 3
    return a * b

# client code
x = 5
y = 2
x = fun3(x, y)
print(x, y, end='')
```

U. What is output when the following client code is run?

```
def fun4(x, y):
    x, y = y, x
    x += 2
    y *= 2
    return x, y


# client code
x = 1
y = 3
x, y = fun4(x, y)
print(x, y, end='')
```

V. What is the cause of the syntax error in the following client code?

```
def fun5(x):
    x += 1
    zz = x * 2
    return zz + x


# client code
x = 3
print(fun5(x), zz)
```

W. How many distinct values can the following code output?

For example **print(random.randint(1, 3))**
can print out 3 distinct values: 1, 2, or 3.

```
x = random.randint(2, 7)
x += random.randint(2, 7)
print(x, end='')
```

X. What is output by the following code?

```
x = 0
y = 13
if x != 0 and y / x > 20:
    print('A')
elif y != x or y / (x - 1) > 0:
    print(y)
```

Y. In Python which of the following data types have
immutable values. Answer with the letters (A, B, and / or C).

A. **str (String)**
B. **int (integers)**
C. **float (floating point numbers)**

2. Programming - 12 points

Complete a function named **get_gpa** that calculates and returns a student's GPA given the number of A's, B's, C's, D's, and F's the student has earned in classes.

Recall GPA is equal to (grade points earned) / (total credit hours attempted)

The number of each letter grade earned (A, B, C, D, and F) are sent as parameters to the function.

Assume each and every class the student takes is worth 3 credits. A's are worth 4 grade points per credit, B's are worth 3 grade points per credit, C's are worth 2 grade points per credit, D's are worth 1 grade point per credit, and F's are worth 0 grade points.

For example, given a student with 3 A's, 4 B's, 1 C, 0 D's, and 2 F's the method returns a GPA of 2.6.

For this question you must write the function definition including parameters and the return statement.

Restriction: Do not call any other Python functions. Avoid unnecessary computations.

3. Programming - 12 points Write a snippet of code (not a function, just the lines of code necessary) to prompt the user for a wind speed and then prints out the classification based on that wind speed.

Use the `int` and `input` functions to prompt the user for the wind speed. You may assume the user correctly enters an int. Any value less than 0 results in the error message shown below. Do not re-prompt the use if they enter a negative wind speed.

The code snippet prints the classification of the given wind speed based on the following criteria.
Note the [symbol means inclusive and the) symbol means exclusive.

[0, 3) -> Calm
[3, 10) -> Light
[10, 20) -> Moderate
[20, 45) -> Strong
>= 45 -> Violent

Restrictions: The only Python functions you may call are the `input`, `int`, and `print` functions.
Avoid doing unnecessary calculations.

Consider the following examples:

Example 1:	Example 2:
Enter wind speed: 20	**Enter wind speed: -5**
Strong	**Invalid wind speed**

4. Programming - 13 points Complete the following function. Do **not** repeat the function header in your answer. Just complete the code of the function.

```
def rolls_to_get_total(sides, goal):
```

The parameter named **sides** represents the number of sides on a die, a single dice. **goal** represents the total we are trying to reach. **Assume sides and goal are both integers and the arguments sent to the function are always greater than 0.**

The method performs a simulation, rolling a die with the given number of sides and adding up the results until the sum of the rolls is greater than or equal to goal. The method then returns the number of rolls of the die it took to reach the goal.

Assume the random module has already been imported.

Restrictions. **The only Python function you may use is the randint function from the random module. Do not use any other Python functions.**

Recall, **randint(1, 6)** would return a random integer from 1 to 6 inclusive with each value being equally likely.

Complete the following function below:
```
def rolls_to_get_total(sides, goal):
```

5. Programming: 13 points Complete the following function. Do **not** repeat the function header in your answer. Just complete the code of the function.

```
def print_areas(max_width, max_height):
```

The parameters **max_width** and **max_height** shall store integer values >= 1. The function prints out all areas of the rectangles as the width, and height of the rectangle, vary from 1 to the given maximum value.

For example, if **max_width** stored 2 and **max_height** stored 4 the function would print out the following:

```
width = 1 height = 1 area = 1
width = 1 height = 2 area = 2
width = 1 height = 3 area = 3
width = 1 height = 4 area = 4
width = 2 height = 1 area = 2
width = 2 height = 2 area = 4
width = 2 height = 3 area = 6
width = 2 height = 4 area = 8
```

Restrictions. **The only Python function you may use are the range and print functions. Do not use any other Python functions. <u>You must use a nested loop in your answer.</u>**