

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

Name: \_\_\_\_\_

## Parsing Strings

1. Given the string `x = 'artificial intelligence for games'`, indicate the resulting string after performing the following array slicing operations.

1 (a) `x[15]`

1 (b) `x[0:10]`

1 (c) `x[11:23]`

1 (d) `x[5:20:2]`

1 (e) `x[::-1]`

## Lists, Tuples, and Dictionaries

Use the following table for the questions in this section:

Unit	X	Y
Marine	10	10
Dropship	5	15
Ghost	7	5
Goliath	2	22
Science Vessel	12	8
Wraith	5	10

- 5 2. Create a *list* called `units` containing all of the units in the above table.

- 5 3. Create a *list of tuples* named `positions` for each of the *X* and *Y* positions of the units.

- 5 4. Create a *dictionary* named `units` for all units in the table, so that `unit['marine']` is `(10,10)`.

These three data structures are central to Python. Be sure that you can use these effectively!

## Ranges

5. Indicate the result of applying the following `range` function<sup>1</sup> operations.

- 1 (a) `range(1,6)`

<sup>1</sup><http://docs.python.org/library/functions.html#range>

1 (b) `range(1,10,2)`

1 (c) `range(10,-3,-3)`

## Loops

10 6. Write a Python `for` loop to print all of the *odd* integers between 1 and 100.

## Variables

10 7. Draw a memory diagram that represents the following code:

```
x = ['a', 'b', 'c', 'd']  
y = x  
r = 3  
s = 3
```

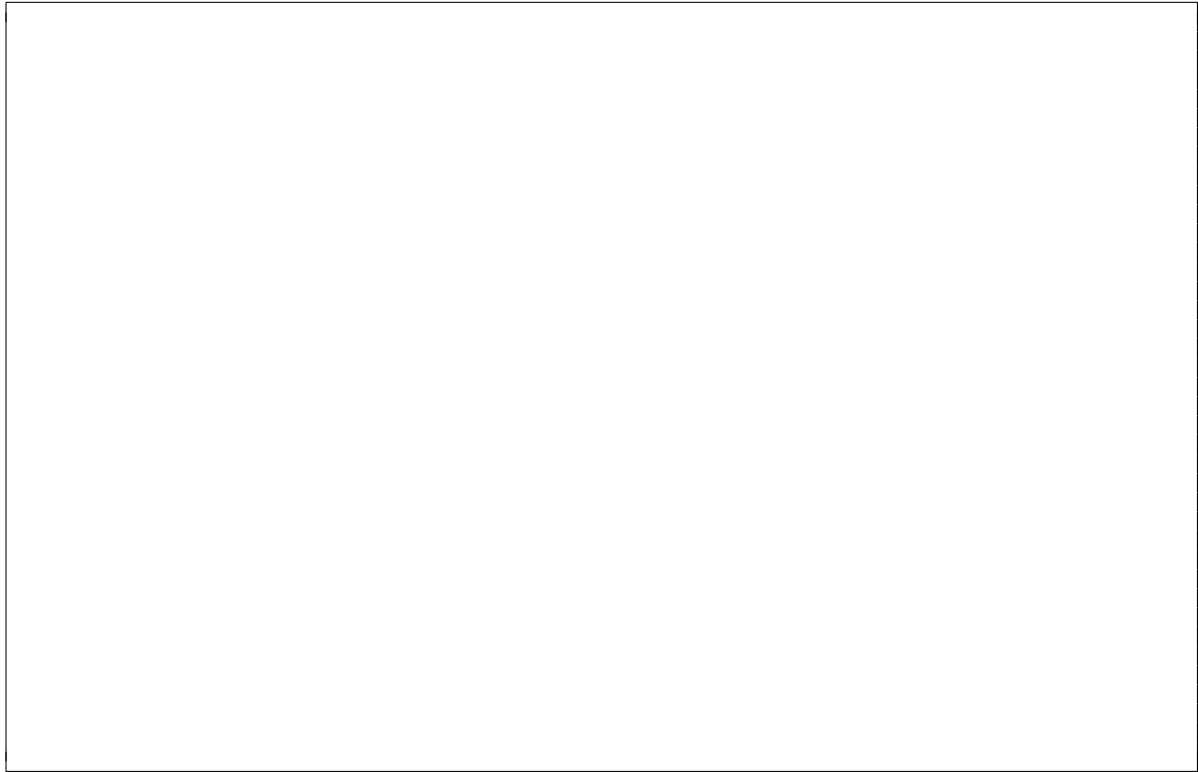
```
x[2] = 'q'  
s = 5
```

```
print x, y  
print r, s
```



## Conditionals

- 10 8. Given a variable  $n$ , if  $n$  is divisible by 3, print `Fizz`, if  $n$  is divisible by 5, print `Buzz`, and if  $n$  is divisible by both 3 and 5, print `FizzBuzz`. Otherwise, print `None`.



## Dictionary Implementation

- 15 9. Assume a dictionary of name and value pairs having 7 entries numbered 0 through 6. Draw a diagram of the resulting dictionary after applying the following insertions if it is a linearly probed hash table. For the hash function, use  $h(k) = \text{ord}(k) - \text{ord}('A')$ .

```
d['A'] = "Alex"
d['D'] = "David"
d['H'] = "Henry"
d['B'] = "Ben"
d['Z'] = "Zack"
```



## Functions

10. Given the functions

$$F(m, a) = m \cdot a$$

and

$$a(t) = t^2 + 4t$$

compute the following:

5 (a)  $F(3, 5)$

5 (b)  $a(3)$

5 (c)  $F(3, a(3))$

Question	Points	Score
1	5	
2	5	
3	5	
4	5	
5	3	
6	10	
7	10	
8	10	
9	15	
10	15	
Total:	83	