PROBLEM 1:  (Honor code (2 pts))

Print your name to acknowledge the Duke Community Standard
Print your name to say you have read all the rules for the exam and abide to follow them

PROBLEM 2:  (Types (6 pts))

PART A (2 pts)
Consider the following line of code that executes with no error. The function mystery1 is not shown.

\[ a = 7.8 + \text{mystery1}(9) \div 2 \]

What type is the variable a, after this line executes?

PART B (2 pts)
Consider the following line of code that executes with no error. The function mystery2 is not shown.

\[ b = 'go' + \text{mystery2}('p') == 'gopher' \]

What type is the variable b, after this line executes?

PART C (2 pts)
Consider the following line of code that executes with no error. The function mystery3 is not shown.

\[ c = \text{mystery3}('duck') \times 3 + 'soup' \]

What type is the variable c, after this line executes?
PROBLEM 3:  (Short code segments (21 pts))

For each of the following problems, use only what is indicated to set result to a Python expression. Do not use any Python methods or string constants.

Here is an example.
Use str with indexing and the concatenation of two items to set result to the string 'by'

```python
str = 'bicycle'
result = str[0] + str[3]
```

Note this answer uses only str, indexing, and the concatenation of two items.
Here is an example of a WRONG answer: result = 'b' + 'y' This answer is wrong because it uses string constants and it did not use str.

PART A (3 pts)
Use str with indexing and the concatenation of four items to make the string 'dart'

```python
str = 'travel abroad'
result = ______________________
```

PART B (3 pts)
Use lst with indexing and concatenation of two items to make the string 'id'.

```python
lst = ['red','pink']
result = ______________________
```

PART C (3 pts)
Use str with splicing and the concatenation of two items to make the string 'tear'

```python
str = 'farsighted'
result = ______________________
```

PART D (3 pts)
Use lst with indexing and the concatenation of two items to make the string 'bluebird'

```python
lst = [['blue','red'],['dog','fish','bird','cat']]
result = ______________________
```

PART E (3 pts)
Use lst with indexing and the concatenation of two items to make the string 'os'

```python
lst = [['gift', 'copy','rely'], ['path','rust']]
result = ______________________
```
PART F (3 pts)
Use lst1 and lst2 with splicing and concatenation to make the list:
['clove', 'dill', 'curry', 'pink', 'blue']

lst1 = ['green', 'red', 'yellow', 'pink', 'blue']
lst2 = ['rue', 'basil', 'clove', 'dill', 'curry', 'sage']
result = ____________________

PART G (3 pts)
Use lst1 and lst2 with splicing, concatenation and [ ]’s to make the list:
['gg', 'cc', ['fff', 'zzz']]

lst1 = ['aa', 'gg', 'cc', 'nn', 'kk']
lst2 = ['mmm', 'rrr', 'bbb', 'fff', 'zzz', 'jjj']
result = ____________________
Problem 4:  (Simple Functions: (14 points))

Part A - Travel Costs (6 pts)

When Terry travels, her employer pays part of the cost for lodging, meals and tickets, but Terry has to pay a percentage of each. Terry has to pay 10% of lodging, 20% of meals and 60% of tickets.

Write the function calculate that has three float parameters: lodging is the cost of lodging, meals is the cost of meals and tickets is the cost of tickets to movies. This function calculates and returns the amount of expenses that Terry will have to pay, factoring in discounts described above. Here are some examples:

<table>
<thead>
<tr>
<th>call</th>
<th>returns</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>calculate(100.0, 100.0, 100.0)</td>
<td>90.0</td>
<td>10% of lodging is 10.0, 20% of meals is 20.0, 60% of tickets is 60.0, 10.0+20.0+60.0 is 90.0</td>
</tr>
<tr>
<td>calculate(200.0, 400.0, 300.0)</td>
<td>280.0</td>
<td>10% of lodging is 20.0, 20% of meals is 80.0, 60% of tickets is 180.0, 20.0 + 80.0 + 180.0 is 280.0</td>
</tr>
</tbody>
</table>

Complete the function calculate below. You do not need to type the def line of the function. You do not need to indent the first line as we will assume it is the first line of this function.

def calculate(lodging, meals, tickets):

Part B - Which is shorter? (8 pts)

Write the function shorterWord that has two string parameters: word1 and word2. This function returns the shorter of the two words. If the words are the same length, then this function returns the string ”equal”. Here are some examples:

<table>
<thead>
<tr>
<th>call</th>
<th>returns</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>shorterWord('cat', 'tiger')</td>
<td>'cat'</td>
<td>'cat' is shorter length than 'tiger'</td>
</tr>
<tr>
<td>shorterWord('grapes', 'figs')</td>
<td>'figs'</td>
<td>'figs' is shorter length than 'grapes'</td>
</tr>
<tr>
<td>shorterWord('lion', 'wolf')</td>
<td>'equal'</td>
<td>'lion' and 'wolf' are the same length</td>
</tr>
</tbody>
</table>

Complete the function shorterWord below. You do not need to type the def line of the function. You do not need to indent the first line as we will assume it is the first line of this function.

def shorterWord(word1, word2):
Consider the following function named randomItem that takes as input the string parameters item1, item2 and item3. This function returns one of the three items randomly, where each item is equally likely to be returned. That is when the function is called with randomItem('a', 'b', 'c'), about one-third of the time it returns 'a', about one-third of the time it returns 'b', and about one third of the time it returns 'c'.

1  def randomItem(item1, item2, item3):
2       num = random.randint(1,3)
3       if num == 1:
4           return item1
5       elif num == 2:
6           return item2
7       else:
8           return item3

Huey wants to write a different function that has 1) item2 to be returned about half the time the function is called and 2) item1 and item3 each returned about a quarter of the time the function is called. Write the function randomItemSlanted that has the same three string parameters as the function randomItem, but using Huey’s criteria.

Complete the function randomItemSlanted below. You do not need to type the def line of the function. You do not need to indent the first line as we will assume it is the first line of this function.

def randomItemSlanted(item1, item2, item3):
Consider the following function named modifyWord that takes as input a string parameter named word. This function is supposed to add the first three letters of the word to the beginning of the string if the word is at least three letters in length, and add the last three letters to the end of the word, if the word is at least six letters in length.

```python
1 def modifyWord(word):
2     answer = word
3     if len(word) > 2:
4         answer = word[:3] + word
5     if len(word) > 5:
6         answer = word + word[-3:]
7     return answer
```

Shown below are three calls to modifyWord, the first two calls return the correct answer and the third call returns the wrong answer.

<table>
<thead>
<tr>
<th>call</th>
<th>returns</th>
<th>should return</th>
</tr>
</thead>
<tbody>
<tr>
<td>modifyWord('cats')</td>
<td>'catcats'</td>
<td>'catcats'</td>
</tr>
<tr>
<td>modifyWord('is')</td>
<td>'is'</td>
<td>'is'</td>
</tr>
<tr>
<td>modifyWord('snowing')</td>
<td>'snowing'</td>
<td>'snowinging'</td>
</tr>
</tbody>
</table>

a) Which line of code has the error?

b) Give the correct line of code for that line.
Mouthwatering Pizza is having a special sale day on their pizzas. They only have one size for pizza. If you have been a customer of theirs for at least 10 days prior to this special day, you get a 10% discount. If you have been a customer of theirs for at least 30 days prior to this special day and ordered at least 50 pizzas, you get a 30% discount. If you have been a customer of theirs for at least 50 days prior to this special day, you get a 20% discount. Each pizza cost $10. Give the customer the best discount.

Write the function named `pizzaOrder` that has three integer parameters: one named `days`, which is the total number of days they have been a customer prior to today, one named `total`, which is the total number of pizzas they have ordered prior to today, and one named `order`, which is the number of pizzas they want to buy today on the special day. This function should return the total cost of the order, with each pizza costing $10 and adding the best discount of the three discounts, if any discounts apply.

Here are several examples of calls to this function.

<table>
<thead>
<tr>
<th>call</th>
<th>returns</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>pizzaOrder(4, 11, 3)</td>
<td>30.00</td>
<td>30.00, no discount applies</td>
</tr>
<tr>
<td>pizzaOrder(11, 11, 5)</td>
<td>45.00</td>
<td>50.00 - 10% discount</td>
</tr>
<tr>
<td>pizzaOrder(60, 19, 3)</td>
<td>24.00</td>
<td>30.00 - 20% discount</td>
</tr>
<tr>
<td>pizzaOrder(65, 70, 5)</td>
<td>35.00</td>
<td>50.00 - 30% discount, qualifies for both 20% and 30% discount, gives better discount</td>
</tr>
</tbody>
</table>

Complete the function below.

```python
def pizzaOrder(days, total, order):
```