

# Practice questions

## Question 1 Functions 15 point

- a. Consider the following code segment:

```
def check_even(number):  
    if number % 2 == 0:  
        return True  
    else:  
        return False  
  
num = 17  
is_even = check_even(num)  
print(is_even)
```

1. What is the value of the variable `c` after executing the code?
2. What would be the output if you modified the code to multiply string `a` by 3 and then concatenate it with string `b`? Please submit the modified code

## Question 2 Functions 210 point

Consider the following code:

```
def calculate_product(a, b):  
    product = a * b  
    return product  
  
x = 5  
y = "2"  
result = calculate_product(x, y)  
print(result)
```

1. Analyze the code provided. What does the `check_even` function do?
2. What will be the output of the code when `num` is assigned the value 17?

## Question 3 Classes 10 point

- a. Define two classes in python – ‘Employee’ The classes should have the following structure:

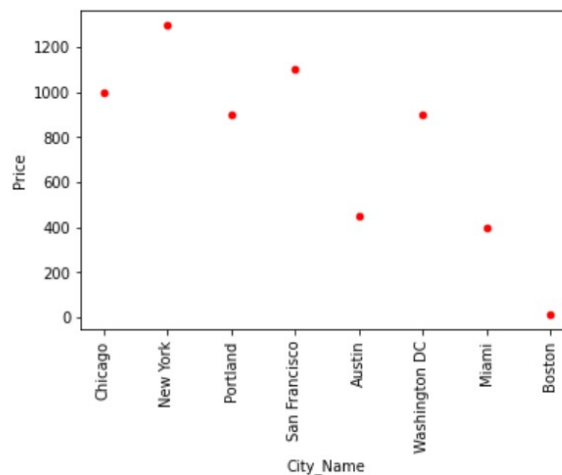
Class	Attributes	Methods
Student	name age salary bonus	A constructor method with parameters for initializing the class's properties.  A method ‘total_salary’ by summing up with salary and bonus

## Question 4      Dataframes and plots      15 point

Consider the following python dictionary:

```
housing_price_dict = {
    'a' : ['Chicago', 'New York', 'Portland', 'San Francisco', 'Austin', 'Washington DC', 'Miami', 'Boston'],
    'b' : [1000, 1300, 900, 1100, 450, 900, 400, 10]
}
```

- Create a dataframe 'city\_prices\_df' from this dictionary with the column names specified 'City\_Name' and 'Price'.
- Provide code to list cities in the dataframe with 'Price' between 400 and 500.
- Provide code to generate the following scatter plot from the 'city\_prices\_df' dataframe with the same color and formatting as the following figure –



## Question 5      Oversampling and undersampling      5 point

- Briefly describe the need and advantages of oversampling and undersampling data before creating machine learning models.

## Question 6      Confusion Matrix      10 points

- A confusion matrix is given below for a newly designed electric car with 5 classes of faults identified in the fault detective system: P- front lights, Q- brake fluid, R- engine, S- battery, T- adaptive cruise control.

Actual	Predicted					
		P	Q			
	P	3	4			
	Q	6	7			
	R	3	9			
	S	10	6			
	T	2	4			

Calculate the following:

Please calculate Accuracy, Precision, Recall and the F1 score for the model.