

# Programming for Artificial Intelligence (Python)

## Homework 1

**Due: March 15 before class**

### Review

In class, we learned to create a sequence using `range(start, end, step)`:

```
1 for i in range(1, 5, 1):  
2     print(i)
```

### 1 Question 1

Print a sequence with equal distance from 0 to 10. Use 0.5 as the step size. You do not need to save this sequence. Just print it out. For example:

```
1 0.0  
2 0.5  
3 1.0  
4 ...  
5 10.0
```

**Hint:** You have to use `range`.

### 2 Question 2

In Python, you can define a function in the following way:

```

1 def myfunc(arg1, arg2):
2     ans = arg1 + arg2
3     return ans

```

Note that in this function, the function name is `myfunc`. It takes two arguments `arg1` and `arg2` and computes the sum of the two arguments. Then it returns the sum. Note that in function definition, you also need to indent the **function body** like you indent the `for` loop body.

If you call this function by

```

1 mysum = myfunc(1, 2)
2 print(mysum)

```

you end up with an output of 3.

You can also write an `if` control flow similarly:

```

1 a = 1
2 b = 2
3 if a > b:
4     print("a is larger")
5 elif b > a:
6     print("b is larger")
7 else:
8     print("a is equal to b")

```

Note the indentation before `print` used to indicate the block of code. `elif` in the code means “else if.”

In the second part of our homework, you need to write a `for` loop to find the slope estimate of the regression we talked about in Friday’s class (without intercept).

In other words, our model is  $y = f(x; b) = bx$ . You will need to find the value  $b$  that minimizes  $L(b) = \sum_{i=1}^5 (y_i - f(x_i; b))^2$ . Practically, you can first define a sequence for  $b$  ranging from 0.5 to 1.5. For example, 0.5, 0.51, 0.52, ..., 1.5. Then, loop over the  $b$  sequence and see which one gives the smallest  $L(b)$ . You should not use the `min` function or the `numpy.argmin` function.

The data we have is

case	x	y
1	0	0
2	1	0
3	2	1
4	3	3
5	4	5

**Hint:** When looping through the  $b$  sequence, keep track of  $L(b)$ . If you find a smaller  $L(b)$ , update your estimate. Otherwise, keep the estimate as it was.