1. Consider the following array of zeros.
   m=6
   A=np. zeros ((m,m))
   Use a for loop to fill A such that its (i,j)th element is given by i + j (for example, the (2,3)th element should be 2 + 3 = 5). Do the same task also with a while loop.
   For for loop varible name is **A_for**; for while loop variable name is **A_while**.

2. Consider the following block:
   x=np. arange (15)
   odd =[] # empty list for odd numbers
   even =[] # empty list for even numbers
   Write a control structure that adds odd numbers in x to the empty lists odd, and even numbers to the empty list even. Do not use another name for lists (odd & even).

3. Let x=[1,2,-3,2.5,7,8,9,-2,-4,-3,4,3.14,5.3,-3.3,8].
   (a) Use a list comprehension to form a list that consists of the negative elements of x.
   Variable name is question3a
   (b) Use a set comprehension to form a set that consists of the negative elements of x.
   Variable name is question3b
   (c) Use a dictionary comprehension to form a dictionary that consists of the even elements of x.
   Variable name is question3c
   (d) Use a tuple comprehension to form a tuple that consists of the positive elements of x.
   Variable name is question3d

4. A quadratic equation has the form of $\mathbf{ax^2+bx+c=0}$. This equation has two solutions for the value of x given by the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

   Write a function that can find the solutions to a quadratic equation. The input to the function should be the values of coefficients a, b, and c. The outputs should be the two values given by the quadratic formula. You may start your function with the following code chunk:

```
def quadratic (a,b,c):
"""
A function that computes the real roots of a quadratic
equation : ax ^2+ bx+c=0.
"""
```

   Apply your function when a,b,c=3,4,-2. Give the name of **question4**

5. The Gaussian density function is given by

$$f(x, m, s) = \frac{1}{\sqrt{2\pi s^2}} \exp\left(-\frac{1}{2s^2}(x-m)^2\right)$$

Write a function in the form of gauss(x, m=0, s=1) for computing the Gaussian density. Compute the Gaussian density for the following cases.

(a) x=0, m=0, s=1. Give the name of **question5a**
(b) x=2, m=0, s=1. Give the name of **question5b**
(c) x=0, m=2, s=1. Give the name of **question5c**
(d) x=0, m=2, s=2. Give the name of **question5d**
(e) x=3, m=3, s=3. Give the name of **question5e**

6. The letter grades and their numerical versions are given in Table 1. Use a if...elif...else

TABLE 1. Grades

Letter	Grade Points
A+	4
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
F	0

structure to write a function in the form of grade_points(letter) that takes a letter as an input, and returns the equivalent number of grade points. In that function create an empty list and append the results (grade points) in it and return that list. Ensure that your function generates an appropriate error message if the user enters an invalid letter grade. Do not forget to insert the error message in that list too.

a. letter ="A" **question6a: variable name**
b. letter ="A-" **question6b: variable name**
c. letter ="C+" **question6c: variable name**
d. letter ="M" **question6d: variable name**

7. A prime number is an integer greater than one that is only divisible by one and itself. Write a function in the form of Prime(n) that determines whether or not n is a prime number. Use your Prime function to determine the prime numbers in x, where x=np.arange(8).

Give variable names as question7_1, question7_2, …., question7_8.

At the end of the function return False or True and store the results under the variable names given above.