

## Assignment 3 1 - Program

```
1 import numpy
2
3 #description of script printed to screen
4 print 'Solving equation of form:'
5 print 'a x^2 + b x + c = 0'
6 print 'for x'
7 #read in data for coefficients; raw_input reads from command line; its
   argument is the prompt displayed to the user; it returns what the user
   entered
8 a = float(raw_input('Input value for coefficient 'a': '))
9 b = float(raw_input('Input value for coefficient 'b': '))
10 c = float(raw_input('Input value for coefficient 'c': '))
11
12 #calculate discriminant of quadratic formula
13 discrim = b**2 - 4.0 * a * c
14
15 #output stuff not dependant on number of x solutions
16 print 'for coefficients of:'
17 print 'a=',a
18 print 'b=',b
19 print 'c=',c
20 #open file in 'w'rite mode
21 fout = open('assign_3_1.out','w')
22 #each file.write statement takes a single string argument; new lines are not
   appended automatically, and must be written in as '\n'
23 fout.write('for coefficients of:\n')
24 fout.write('a='+str(a)+'\n')
25 fout.write('b='+str(b)+'\n')
26 fout.write('c='+str(c)+'\n')
27
28 if (discrim > 0):
29     #calculate the two values for x; unlike the previous assignment, use two
       element 'list' (similar to an array)
30     x = [(-b + numpy.sqrt(discrim))/(2.0*a),(-b - numpy.sqrt(discrim))/(2.0*a)]
31     print 'x values of:'
32     print x[0] #python lists/arrays index from zero, not one
33     print 'and'
34     print x[1]
35     fout.write('x values of:\n')
36     fout.write(str(x[0])+'\n') #python lists/arrays index from zero, not one
37     fout.write('and\n')
38     fout.write(str(x[1])+'\n')
39 elif (discrim == 0):
40     x = -b/(2.0*a)
41     print 'x value of:'
42     print x
43     fout.write('x value of:\n')
44     fout.write(str(x)+'\n') #python lists/arrays index from zero, not one
45 else:
46     print 'No real solutions for x'
47     fout.write('No real solutions for x\n')
48
49 #close the file
50 fout.close()
```

## Assignment 3 1 - Output

```
1 for coefficients of:
```

```
2 a=2.0
3 b=-12.0
4 c=18.0
5 x value of:
6 3.0
```

## Assignment 3 2 - Program

```
1 import numpy
2 from sys import exit #import the single method 'exit' from the module 'sys'
3
4 #description of script printed to screen
5 print 'Solving equation of form:'
6 print 'a x^2 + b x + c = 0'
7 print 'for x'
8
9 mode = int(raw_input('Please select operation mode; 1 for output to screen
    only, 2 for overwriting output file, 3 for appending to output file: '))
10 if (mode not in [1,2,3]):
11     print 'Mode selected not valid, please use 1, 2 or 3'
12     exit() #routine from sys, quits python instantly
13
14 #read in data for coefficients; raw_input reads from command line; its
    argument is the prompt displayed to the user; it returns what the user
    entered
15 a = float(raw_input('Input value for coefficient 'a': '))
16 b = float(raw_input('Input value for coefficient 'b': '))
17 c = float(raw_input('Input value for coefficient 'c': '))
18
19 #calculate discriminant of quadratic formula
20 discrim = b**2 - 4.0 * a * c
21
22 #output stuff not dependant on number of x solutions
23 print 'for coefficients of:'
24 print 'a=',a
25 print 'b=',b
26 print 'c=',c
27
28 if (mode == 2):
29     #open file in 'w'rite mode
30     fout = open('assign_3_2.out','w')
31 elif (mode == 3):
32     #open file in 'a'ppend mode
33     fout = open('assign_3_2.out','a')
34     fout.write('-----\n')
35
36 if (mode > 1):
37     #each file.write statement takes a single string argument; new lines are
    not appended automatically, and must be written in as '\n'
38     fout.write('for coefficients of:\n')
39     fout.write('a='+str(a)+'\n')
40     fout.write('b='+str(b)+'\n')
41     fout.write('c='+str(c)+'\n')
42
43 if (discrim > 0):
44     #calculate the two values for x; unlike the previous assignment, use two
    element 'list' (similar to an array)
45     x = [(-b + numpy.sqrt(discrim))/(2.0*a),(-b - numpy.sqrt(discrim))/(2.0*a)]
46     print 'x values of:'
47     print x[0] #python lists/arrays index from zero, not one
```

```

48     print 'and'
49     print x[1]
50     if (mode > 1):
51         fout.write('x values of:\n')
52         fout.write(str(x[0])+'\n') #python lists/arrays index from zero, not one
53         fout.write('and\n')
54         fout.write(str(x[1])+'\n')
55 elif (discrim == 0):
56     x = -b/(2.0*a)
57     print 'x value of:'
58     print x
59     if (mode > 1):
60         fout.write('x value of:\n')
61         fout.write(str(x)+'\n') #python lists/arrays index from zero, not one
62 else:
63     print 'No real solutions for x'
64     if (mode > 1):
65         fout.write('No real solutions for x\n')
66
67 if (mode > 1):
68     #close the file
69     fout.close()

```

## Assignment 3 2 - Output

```

1  for coefficients of:
2  a=4.0
3  b=8.0
4  c=4.0
5  x value of:
6  -1.0
7  -----
8  for coefficients of:
9  a=15.0
10 b=-8.0
11 c=12.0
12 No real solutions for x
13 -----
14 for coefficients of:
15 a=5.0
16 b=6.0
17 c=1.0
18 x values of:
19 -0.2
20 and
21 -1.0

```