

```

1  """
2  CS241 Checkpoint 8B
3  Written by Chad Macbeth
4  """
5
6  # This checkpoint shows two different ways to control the setting of
7  # the GPA. The previous checkpoint had a get/set function but they
8  # could easily be circumvented by the user.
9  #
10 # The @property tag is used for the getter.
11 # The @varname.setter tag (where varname is the name of the variable) is used for the
12 # setter.
13 #
14 # If anyone (in or out of the class) uses or changes the
15 # variables, these functions will be used.
16 # Users who create an object are expected to directly access or
17 # change the data in the object. Using properties, you can control how
18 # these variables are modified.
19
20 ### Class represents a GPA and allows conversion
21 ### between letter and grade point average.
22 class GPA:
23
24     ### Initialize the GPA object
25     def __init__(self):
26         self.gpa = 0.0
27
28     ### Accessor for GPA
29     @property
30     def gpa(self):
31         return self._gpa
32
33     ### Mutator for GPA
34     ### GPA must be positive
35     @gpa.setter
36     def gpa(self, gpa):
37         if gpa < 0.0:
38             self._gpa = 0.0
39         else:
40             self._gpa = gpa
41
42     ### Convert the GPA to a letter grade
43     @property
44     def letter(self):
45         if self.gpa <= 0.99:
46             return "F"
47         elif self.gpa <= 1.99:
48             return "D"
49         elif self.gpa <= 2.99:
50             return "C"
51         elif self.gpa <= 3.99:
52             return "B"
53         else:
54             return "A"
55
56     ### Convert a letter to a GPA
57     @letter.setter
58     def letter(self, letter):
59         if letter == "A":
60             self.gpa = 4.0
61         elif letter == "B":
62             self.gpa = 3.0
63         elif letter == "C":
64             self.gpa = 2.0
65         elif letter == "D":
66             self.gpa = 1.0

```

```
66         else:
67             self.gpa = 0.0
68
69
70
71     ### Test the GPA Class
72     def main():
73         student = GPA()
74
75         print("Initial values:")
76         print("GPA: {:.2f}".format(student.gpa))
77         print("Letter: {}".format(student.letter))
78
79         value = float(input("Enter a new GPA: "))
80
81         student.gpa = value
82
83         print("After setting value:")
84         print("GPA: {:.2f}".format(student.gpa))
85         print("Letter: {}".format(student.letter))
86
87         letter = input("Enter a new letter: ")
88
89         student.letter = letter
90
91         print("After setting letter:")
92         print("GPA: {:.2f}".format(student.gpa))
93         print("Letter: {}".format(student.letter))
94
95     if __name__ == "__main__":
96         main()
97
98
99
100
```