```python
2 #Program3
3 #MSBA 605
4 #Due: 9/11/18
5 #Description: We seek to pass the list of student grades to the function described below.
6 # This should will tabulate and display a bar chart summarizing
7 # the number students earning each grade (A, B, C, D, F).
8
9 def calcGrade(score): # Calculate letter grade given score
10     if (score >= 90):
11         grade = "A"
12     elif (score >= 80):
13         grade = "B"
14     elif (score >= 70):
15         grade = "C"
16     elif (score >= 60):
17         grade = "D"
18     else:
19         grade = "F"
20
21     return grade
22
23 # Test grade function
24 numScores = int(input("How many test scores to grade? "))
25 gradebook = { } #Initializing the dictionary as an empty set.
26
27 for i in range(numScores):
28     name = str(input("What is the student's name?")) # Take in the student's name.
29     score = float(input("Score " + str(i+1) + ": "))
30     grade = calcGrade(score)
31     gradebook.update({name:grade}) # This is the item that actually adds a name and an associated grade to my gradebook.
32
33 print("Gradebook Results (sorted alphabetically):")
34 #This is purely cosmetic, but it gives information about how results will be returned.
35
36 for key in sorted(gradebook.keys()) :   # This 'for' loop sorts my gradebook.
37     print(key , " :: " , gradebook[key]) # This prints the key, as well as the associated value with that key.
38
39
40 # Part 1: Tablulate count of each letter grade
41
42 lettertot = {"A":0,"B":0,"C":0,"D":0,"F":0} # This initializes the list of letter grades and totals.
43
44 for key in gradebook:           #Traverse the gradebook
45     if gradebook[key] is "A":      # If the letter grade is an A...
46         lettertot["A"] += 1          # Then Add 1 to the dictionary's value for A
47     elif gradebook[key] is "B":   # If the letter grade is a B...
48         lettertot["B"] += 1          # Then add 1 to the dictionary's value for B
49     elif gradebook[key] is "C":   # And so on...
50         lettertot["C"] += 1
51     elif gradebook[key] is "D":
52         lettertot["D"] += 1
53     elif gradebook[key] is "F":
54         lettertot["F"] += 1
55
56 print("The array of total grades is",lettertot) # This tests the above function.
57
58 # Part 2: Create chart
59
60 import matplotlib.pyplot as plt
61     #Above, We are importing matplotlib as a function we'll call plt later.
62
63 labels = lettertot.keys()
64     # I am setting our labels for the "x axis" as the lettergrades from our above established dictionary.
65 heights = lettertot.values()
66     # I am setting the frequency/heights for our values as the values from our dictionary above.
67 plt.bar(labels, heights) # This actually creates the bar chart.
68 plt.title("Grade distribution") #Titling our plot.
69 plt.xlabel("Lettergrades") #Labelling the x axis
70 plt.ylabel("Frequency") #Labelling the y axis
71 plt.show() #This shows the output of our chart.
```

**Results**

```
How many test scores to grade? 3

What is the student's name?Jessica

Score 1: 91

What is the student's name?Joe

Score 2: 85

What is the student's name?David

Score 3: 78
Gradebook Results (sorted alphabetically):
David  ::  C
Jessica  ::  A
Joe  ::  B
The array of total grades is {'A': 1, 'B': 1, 'C': 1, 'D': 0, 'F': 0}
```



Grade distribution