**Lord of the Rings Age Problem Version 4: Fellowship of the Ring**

Finally, you should be ready to write the most functional version of this program. You will compare the age of a given character with the nine companions of the Fellowship of the Ring.

Write a program that compares the age of any character of your choice with the nine companions on quest to destroy the One Ring: the hobbit and ring bearer Frodo Baggins and his gardener Sam Gamgee, the wizard Gandalf, the elf Legolas, the dwarf Gimli, the men Aragorn the ranger and Boromir of Gondor, and the two young hobbits Merry Brandybuck and Pippin Took ([source](https://en.wikipedia.org/wiki/The_Fellowship_of_the_Ring#Members)).

| We assume that Gandalf is approximately 2000 years old, even though this is the age of his current physical form. A reasonable estimate of his true form is unknown. Some researchers approximate it at about 55000 years. Maybe more. ([source](https://www.cbr.com/lord-of-rings-fellowship-member-ages-explained/)) |
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# **What to do**

You should refactor the previous version of your code.

| So, what does refactoring mean? *"Refactoring is a change made to the internal structure of software to make it easier to understand and cheaper to modify without changing its observable behavior."* Refactoring is done to make the code "easier to understand and cheaper to modify." ([source](https://learning.oreilly.com/library/view/refactoring-improving-the/9780134757681/ch02.xhtml#ch02lev1sec2)) |
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1. Ask the user for a name and age of a character.
2. Print out a message displaying the character's age and listing the characters who are older than the given character (print nothing if there are none)
3. Print out a message displaying the character's age and listing the characters who are younger than the given character (print nothing if there are none)

If the entered age is negative, print "Invalid age."

Here is the data that you will need:

1. Frodo (51 years old)
2. Samwise (39 years old)
3. Gandalf (2000 years old)
4. Legolas (2931 years old)
5. Gimli (140 years old)
6. Aragorn (88 years old)
7. Boromir (41 years old)
8. Merry (37 years old)
9. Pippin (29 years old)

**added (Sep 18): from here**

The recommended data structure for this version is **two parallel lists**. You should hardcode them as follows:

| names = [  "Frodo",  "Samwise",  "Gandalf",  "Legolas",  "Gimli",  "Aragorn",  "Boromir",  "Merry",  "Pippin", ] ages = [51, 39, 2000, 2931, 140, 88, 41, 37, 29] |
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You can **not** use dictionaries.

**to here**

We have nine companions in the Fellowship of the Ring but your code must support **any number of companions** (10, 100, 10000). That means that you can not use hard coded variables and multi-level nested if statements anymore.

Think of a way to **generalize** your algorithm. Take some time to think about this problem and do your best to come up with **your own** solution. **Only** when you feel stuck, use the hints below. Open them one by one.

# **Hints**

1. Think about how iteration can help you in this version of the program?
2. Now, you can not store characters' ages in individual hard coded variables since you don't know how many characters you might have. Think about which data structure can help you solve this (two parallel lists are highly recommended)?
3. Think about which data you need to store and manipulate? Remember that there are names and ages of the Fellowship of the Ring companions. How would you relate names to ages?
4. Think about how you can use join() to "glue" elements of a sequence?

# **Program name**

Save your program as age4.py.

# **Demo**

<https://asciinema.org/a/CWzcwP3e7fhBwzo3NHOCjAhbU>

# **Testing**

To make sure your program works correctly, you should test it.

Test Case 1

Run your program with python age4.py. Type Eowyn, then 24 and press Enter. Your program should print:

| Eowyn is 24 years old, and they are younger than Frodo, Samwise, Gandalf, Legolas, Gimli, Aragorn, Boromir, Merry, Pippin. |
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Test Case 2

Run your program with python age4.py. Type Bilbo, then 129 and press Enter. Your program should print:

| Bilbo is 129 years old, and they are older than Frodo, Samwise, Aragorn, Boromir, Merry, Pippin. Bilbo is 129 years old, and they are younger than Gandalf, Legolas, Gimli. |
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Test Case 3

Run your program with python age4.py. Type Galadriel, then 7000 and press Enter. Your program should print:

| Galadriel is 7000 years old, and they are older than Frodo, Samwise, Gandalf, Legolas, Gimli, Aragorn, Boromir, Merry, Pippin. |
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Test Case 4

Run your program with python age4.py. Type Test, then -1 and press Enter. Your program should print:

| Invalid age. |
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# **Submitting**

Submit age4.py via eClass.

*You may submit either all versions you complete, or only the final version.*