

CS115, Introduction to Computer Programming

Fall 2019

Programming Assignment #4

The (as yet undiscovered) beings that live on the planet Neptune have a very unusual calendar system. Instead of the usual 7 days in a week that we normally use here on Earth (Sunday, Monday, Tuesday, etc.), the inhabitants (known as Neptunians) have 15 days in their week, each named after a famous star in the night sky – Polarisday, Siriusday, Betelgeuseday, Rigelday, Vegaday, Antaresday, Canopusday, Mizarday, Fomalhautday, Arcturusday, Denebday, Procyonday, Spicaday, Thubanday, and Regulusday. Also, instead of the usual number of days in each month that we use here on Earth (28, 29, 30, or 31), the Neptunians allow as few as 42 days in a month, or as many as 95.

Consider what a typical calendar for a Neptunian month would look like, for example, a month with 63 days that starts on Vegaday:

Po	Si	Be	Ri	Ve	An	Ca	Mi	Fo	Ar	De	Pr	Sp	Th	Re
				1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63								

The Neptunians have one further oddity in their calendar system. If a month happens to be a so-called Jubilee month, then the second and third weeks of that month skip the days of Betelgeuseday, Antaresday, Canopusday, Arcturusday, Denebday, and Procyonday. (These six days are normally the busiest workdays of the week anyway, and skipping over them is a good cause for celebration.) For example, here's what the calendar would look like for a Jubilee month with 63 days that starts on Vegaday:

Po	Si	Be	Ri	Ve	An	Ca	Mi	Fo	Ar	De	Pr	Sp	Th	Re
				1	2	3	4	5	6	7	8	9	10	11
12	13	->	14	15	----->		16	17	----->			18	19	20
21	22	->	23	24	----->		25	26	----->			27	28	29
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
60	61	62	63											

So, in order to create a Neptunian calendar for any given month, you really need to know only three basic pieces of information:

1. What day of the week does the 1st day of the month start on?
2. How many days are there in the month?
3. Is this a Jubilee month?

Design, write, and execute a Python language program that asks the user what day of the week their chosen month starts on (“Polarisday”, “Siriusday”, etc.), how many days there are in that month

(between 42 and 95), and whether or not it is a Jubilee month ("yes" or "no"). Your program should then display the appropriate Neptunian calendar for that particular month using the rules given above. Finally, your program should continue asking the user for information about more calendars, and keep displaying them, until the user indicates that he or she is ready to stop (by answering "yes" or "no" to an appropriate question).

Rather than exhaustively listing all possible calendars in your Python program (there are 1,620 different ones!), your program should instead be able to display any requested calendar in a few relatively short secondary functions, which use techniques involving selection (if/else statements and/or if/elif/else statements) and repetition (while loops and/or for loops).

Your program should be organized into a main function and several appropriate secondary functions that communicate with each other using arguments, parameters, and functional values in order to ask the user for inputs, to display outputs, etc.

Your program should use repetition type-checking data validation techniques to insure that all inputs provided by the user are of the expected data type, and repetition range-checking data validation techniques to insure that all inputs provided by the user are within expected ranges.

Be sure to follow the overall requirements for programming assignments found in the "Programming Requirements" document. You'll need to run all testcases (both the instructor's and you own) as described below. Be sure to follow the requirements for formatting your executions found in the "How to Prepare Programming Assignment Executions for Submission" document.

Required Testcases (provided by the instructor):

Required Testcase #1

- a) for the start day enter **Vegaday**
- b) for the number of days in the month enter **63**
- c) for whether it's a Jubilee Month enter **no**
- d) for the question about creating another calendar enter **yes**
- e) for the start day enter **Vegaday**
- f) for the number of days in the month enter **63**
- g) for whether it's a Jubilee Month enter **yes**
- h) for the question about creating another calendar, enter **no**

Required Testcase #2

- a) for the start day enter **Polarisday**
- b) for the number of days in the month enter **42**
- c) for whether it's a Jubilee Month enter **no**
- d) for the question about creating another calendar enter **no**

Required Testcase #3

- a) for the start day enter **Regulusday**
- b) for the number of days in the month enter **95**
- c) for whether it's a Jubilee Month enter **yes**
- d) for the question about creating another calendar enter **no**

Required Testcase #4

- a) for the start day enter **Anyday**
- b) when that is rejected enter **Fomalhautday**
- c) for the number of days in the month enter **lots**
- d) when that is rejected enter **96**
- e) when that is rejected enter **41**
- f) when that is rejected enter **50**
- g) for whether it's a Jubilee Month enter **maybe**
- h) when that is rejected enter **yes**
- i) for the question about creating another calendar enter **nah**
- j) when that is rejected enter **no**

Proposed Testcases (created by you):

Develop and execute at least 12 sets of your own well-designed and thorough testcases.

To complete this programming assignment, submit your Listing file (to be named "program4 listing.py") and formatted Executions PDF document (to be named "program4 executions.pdf") attached to the appropriate submission link on the CS115 Blackboard Course Shell by the "Listing and Executions" due date stated there.

NOTE: In order to receive any credit for this assignment, you must submit a Python program file in text format with a .py file extension, and an executions document in PDF format with a .pdf file extension and with internal formatting exactly as specified in the "How to Prepare Programming Assignment Executions for Submission" document. Submissions that do not follow these requirements will receive a grade of 0.

On the following pages is a sample of how your program should look when executed.

Good luck!

Neptunian Calendar Program, version 1.0
(c) (your name), 2019

Enter the starting day of the month: Vegaday

Enter the number of days in the month: 63

Is this a Jubilee month? no

Neptunian calendar for month starting on Vegaday with 63 days

Po	Si	Be	Ri	Ve	An	Ca	Mi	Fo	Ar	De	Pr	Sp	Th	Re
				1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63								

Create another calendar? yes

Enter the starting day of the month: Vegaday

Enter the number of days in the month: 63

Is this a Jubilee month? yes

Neptunian calendar for Jubilee month starting on Vegaday with 63 days

Po	Si	Be	Ri	Ve	An	Ca	Mi	Fo	Ar	De	Pr	Sp	Th	Re
				1	2	3	4	5	6	7	8	9	10	11
12	13	->	14	15	----->	16	17	----->	18	19	20			
21	22	->	23	24	----->	25	26	----->	27	28	29			
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
60	61	62	63											

Create another calendar? yes

Enter the starting day of the month: Sunnyday

Invalid starting day, should be one of Polarisday,
Siriusday, Betelgeuseday, Rigelday, Vegaday, Antaresday,
Canopusday, Mizarday, Fomalhautday, Arcturusday, Denebday,
Procyonday, Spicaday, Thubanday, or Regulusday, try again.

Enter the starting day of the month: 3

Invalid starting day, should be one of Polarisday,
Siriusday, Betelgeuseday, Rigelday, Vegaday, Antaresday,
Canopusday, Mizarday, Fomalhautday, Arcturusday, Denebday,

Procyonday, Spicaday, Thubanday, or Regulusday, try again.

Enter the starting day of the month: Antaresday

Enter the number of days in the month: plenty

Invalid number of days, should be a whole number, try again.

Enter the number of days in the month: 101

Invalid number of days, should be 42 to 95, try again.

Enter the number of days in the month: -5

Invalid number of days, should be 42 to 95, try again.

Enter the number of days in the month: 72

Is this a Jubilee month? maybe

Invalid response, should be yes or no, try again.

Is this a Jubilee month? yes

Neptunian calendar for Jubilee month starting on Antaresday with 72 days

Po	Si	Be	Ri	Ve	An	Ca	Mi	Fo	Ar	De	Pr	Sp	Th	Re
					1	2	3	4	5	6	7	8	9	10
11	12	->	13	14	----->		15	16	----->			17	18	19
20	21	->	22	23	----->		24	25	----->			26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
59	60	61	62	63	64	65	66	67	68	69	70	71	72	

Create another calendar? nope

Invalid response, should be yes or no, try again.

Create another calendar? no

Finishing Neptunian Calendar Program, version 1.0