CS 111
Introduction to Computer Science

Fall 2015

Lecture 6: Sep 24, 2015

(This is only a part of the lecture.
All code covered in lecture is in
Sakai->Resources)

Problem to Solve

Get the time of sunrise (e.g. 6:25 AM) and sunset (e.g. 7:15 pm) from the user, and compute and print the daylight duration in hours and minutes (e.g. 12 hours, 50 minutes)

Problem Analysis

What are the inputs?

1. Sunrise time
2. Sunset time

What are the outputs?

Daylight duration hours and minutes

What are the unacceptable inputs/error conditions?

1. Invalid sunrise time input (various possibilities)
2. Invalid sunset time input (various possibilities)
3. …

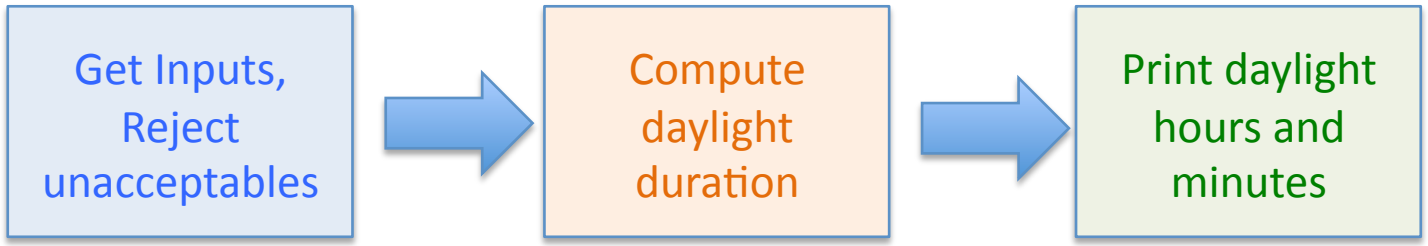
(The possibilities within each category can be detailed when the program is written)

Program Design

Since the INPUTS are somewhat more complex (including possible error conditions), it would be worthwhile to think of getting them from user as a "sub program" (so you can think of this in isolation from the other parts).

Similarly, the COMPUTATION for daylight duration is more complex than the fahrenheit-celsius problem, it could also be treated as a "sub program" (again, think of it in isolation, assuming you have designed the inputs sub-program and have the input data available)

Once the daylight hours and minutes are computed, printing them is fairly straightforward



Design Decisions for Input

What should be the structure and format of the inputs?

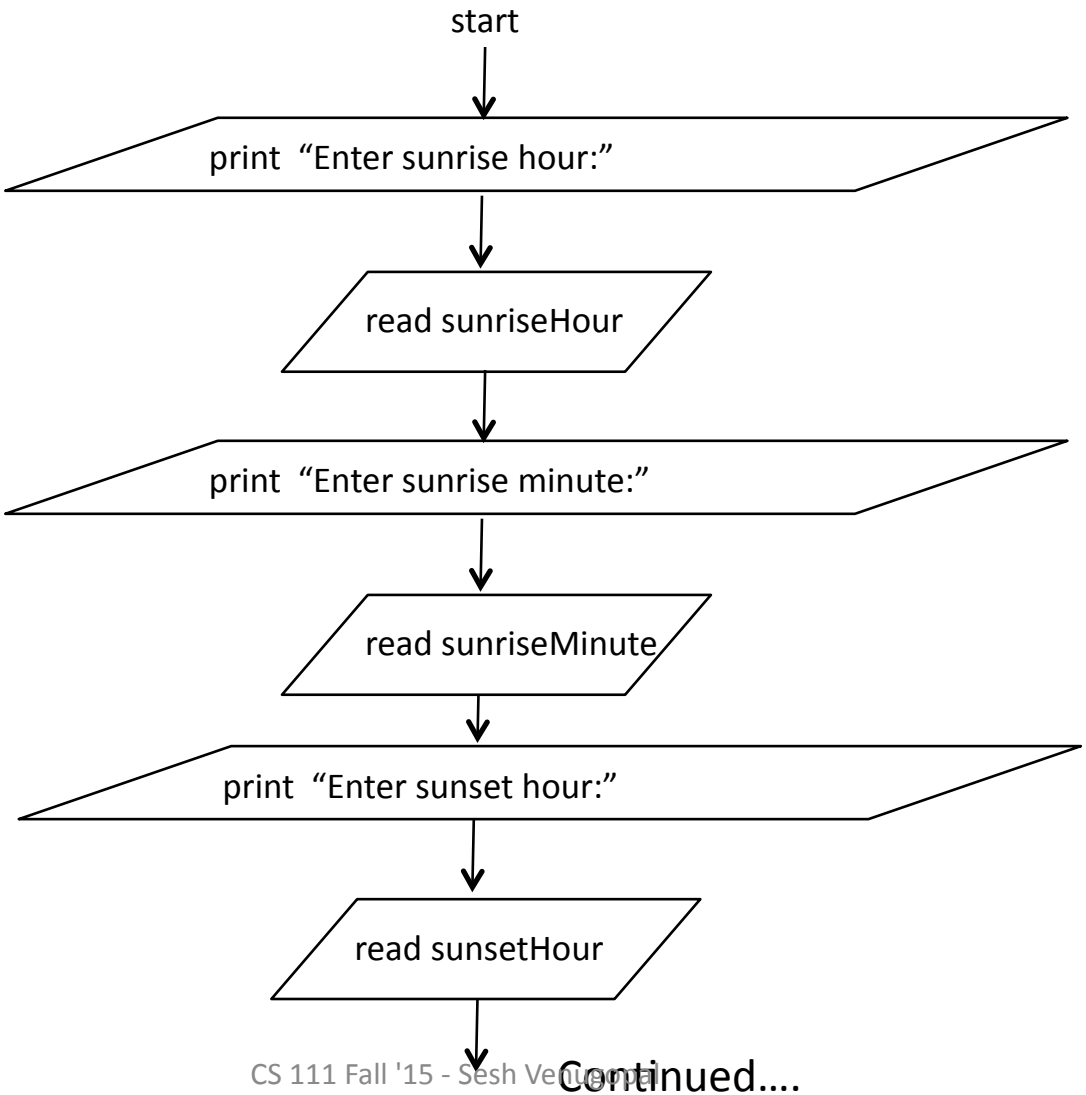
1. Ask for both sunrise and sunset times in one shot, OR ask for sunrise time first, and then sunset time?

2. Should the time be entered in hh:mm format, OR should you ask for hour first, then minutes? AND, is it a 12 hour clock (with AM/PM as inputs), or a 24 hour (military) clock?

3. If time is entered in hh:mm format, the program will need to locate the ':' and separate the hour from the minutes

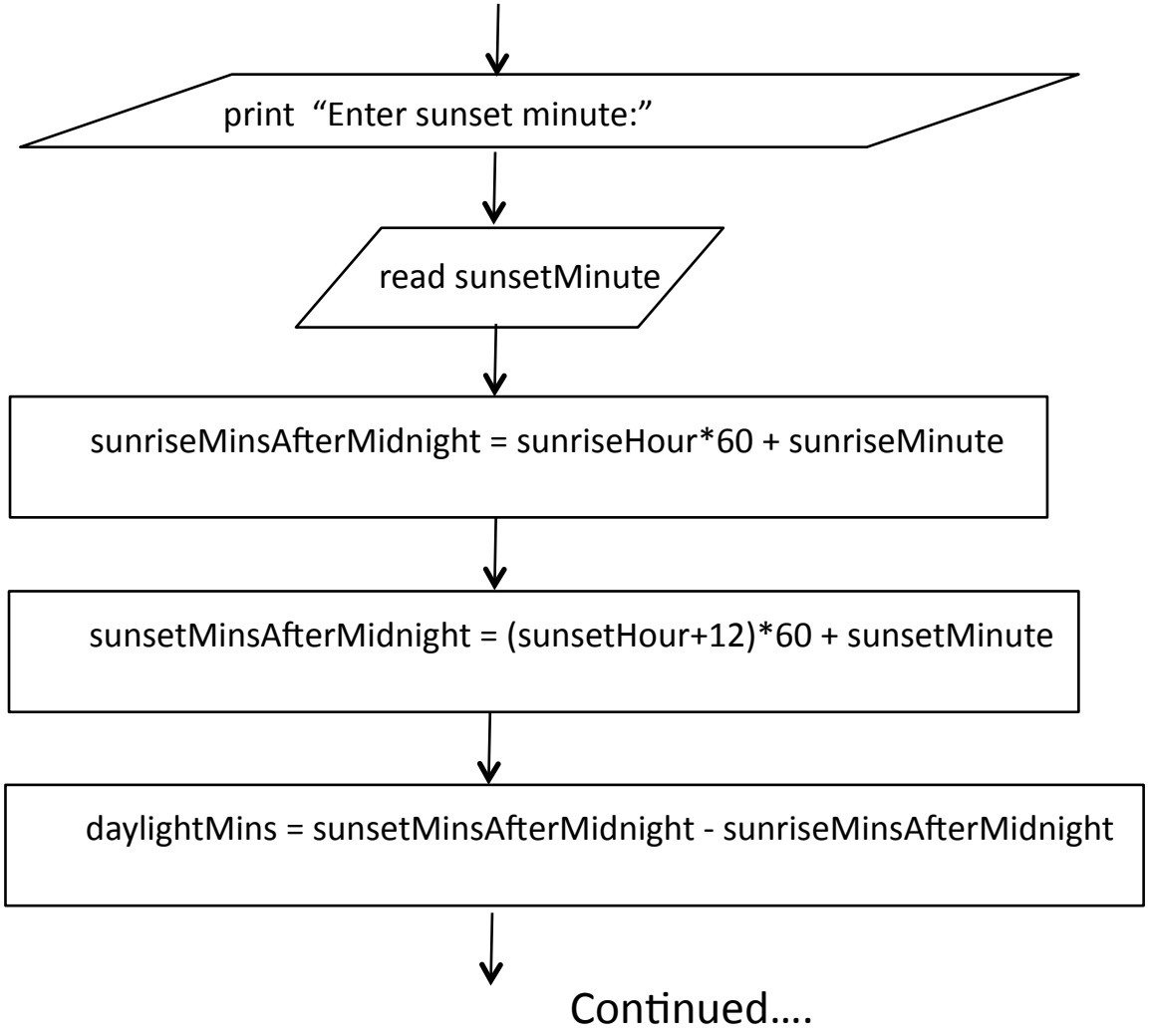
Sample Flowchart 1

(Assuming sunrise is before noon, sunset is after noon, 12 hour clock, and all inputs within acceptable numerical range)



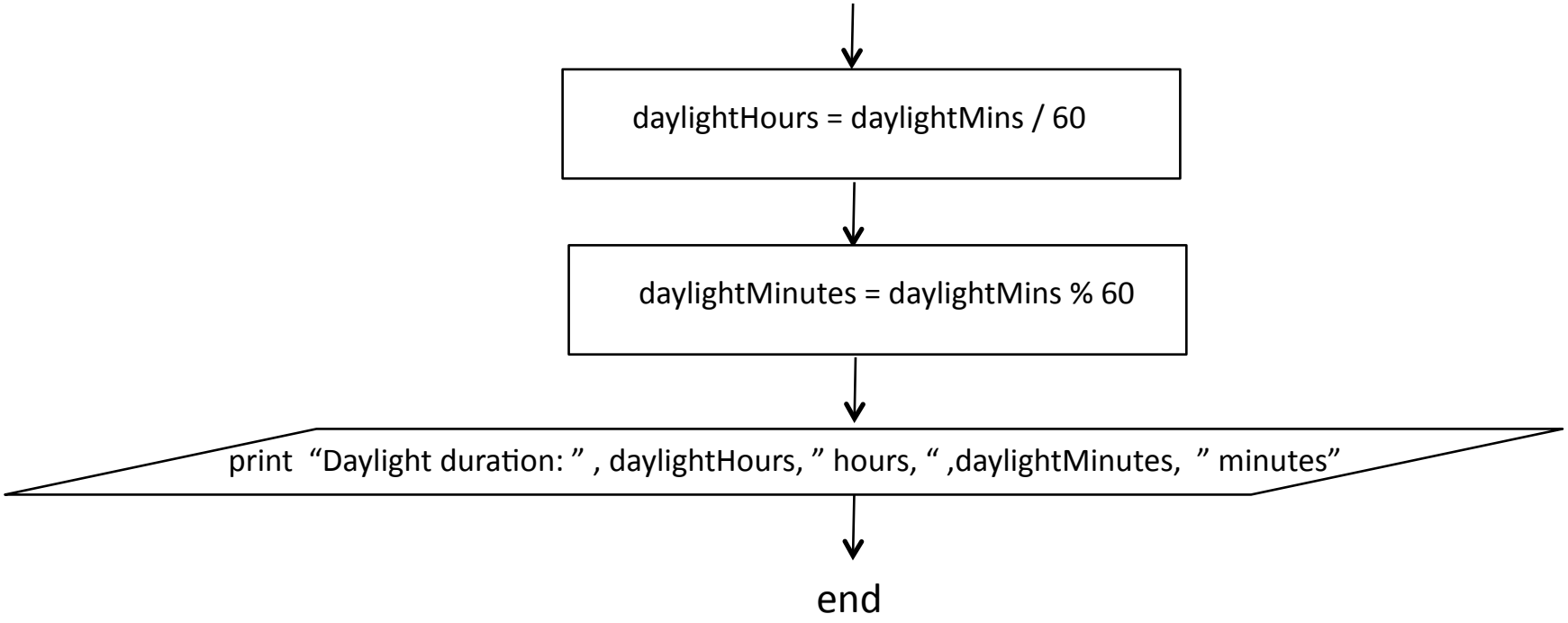
Sample Flowchart

(Continued)



Sample Flowchart

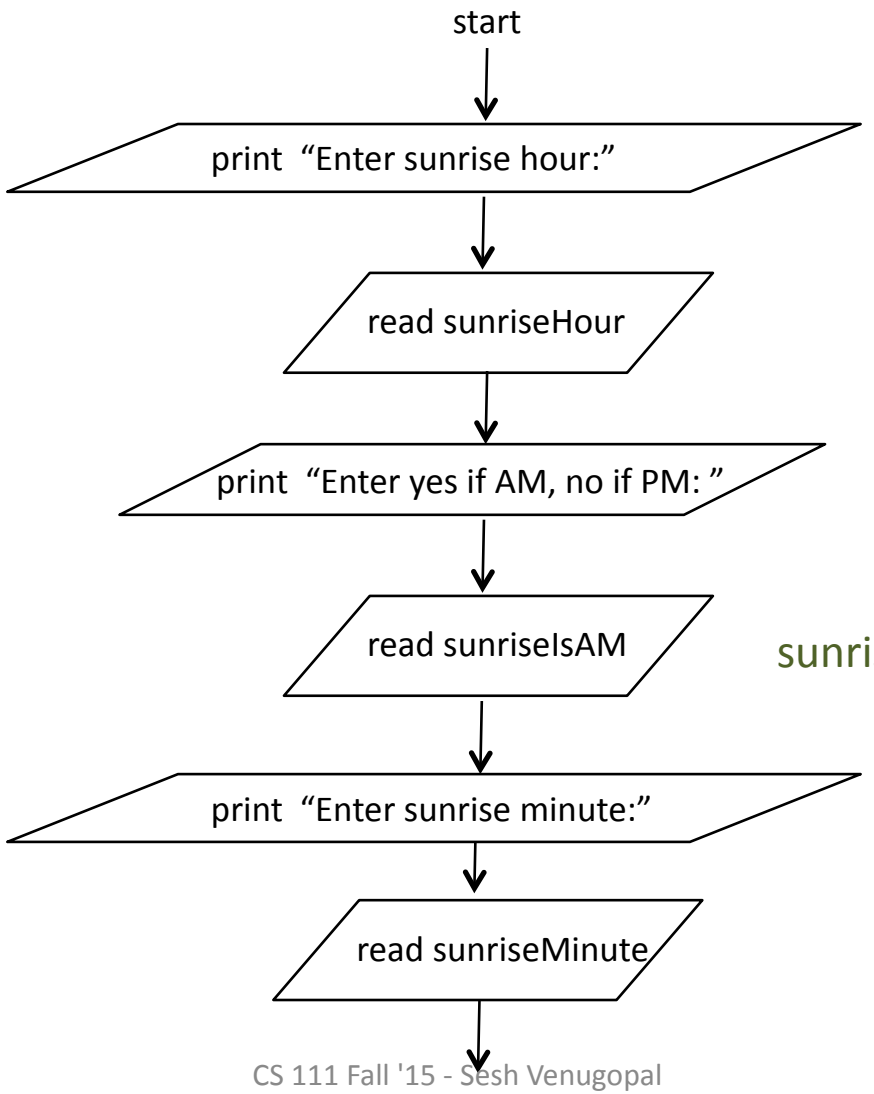
(Continued)



(Note: The '/' here gives the quotient, so for example 710 / 60 would be 11. And the '%' gives the remainder, so 710 % 60 would be 50)

Sample Flowchart 2

(Sunrise could be past noon, sunset could be before noon, 12 hour clock, all inputs within acceptable acceptable range)

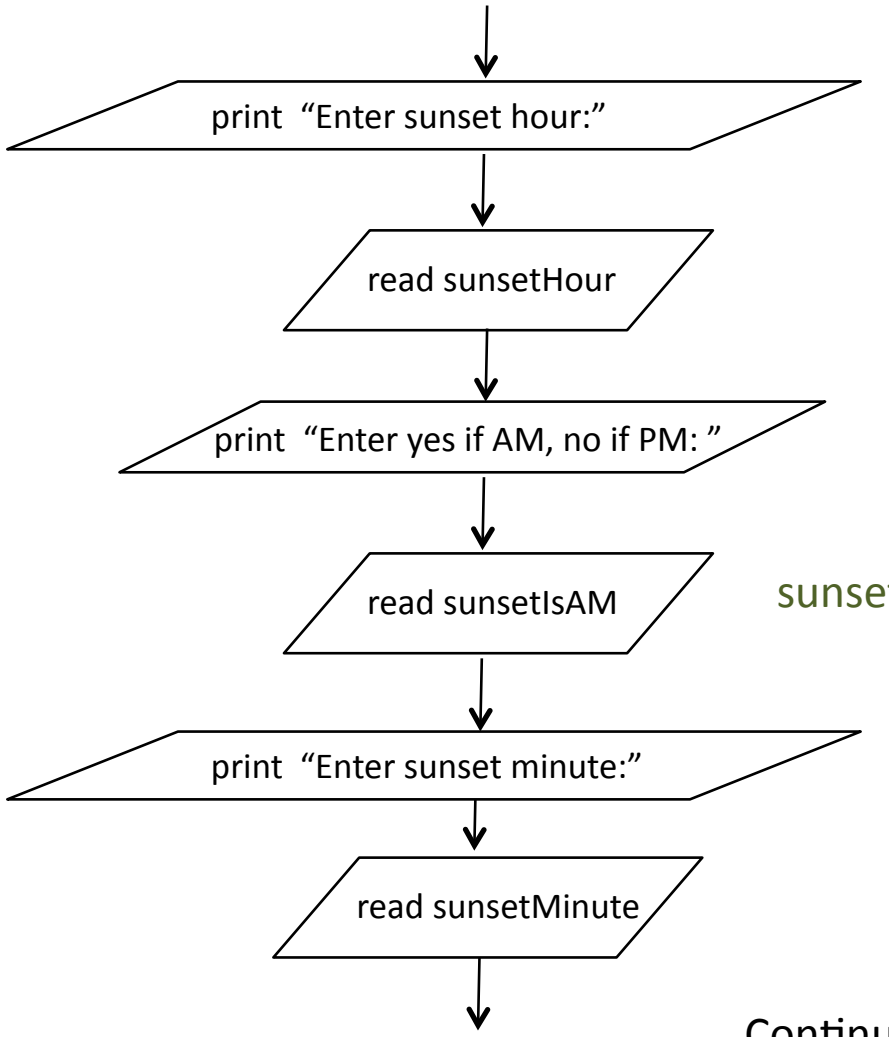


sunriseIsAM is a boolean

Continued….

Sample Flowchart 2

(Continued)

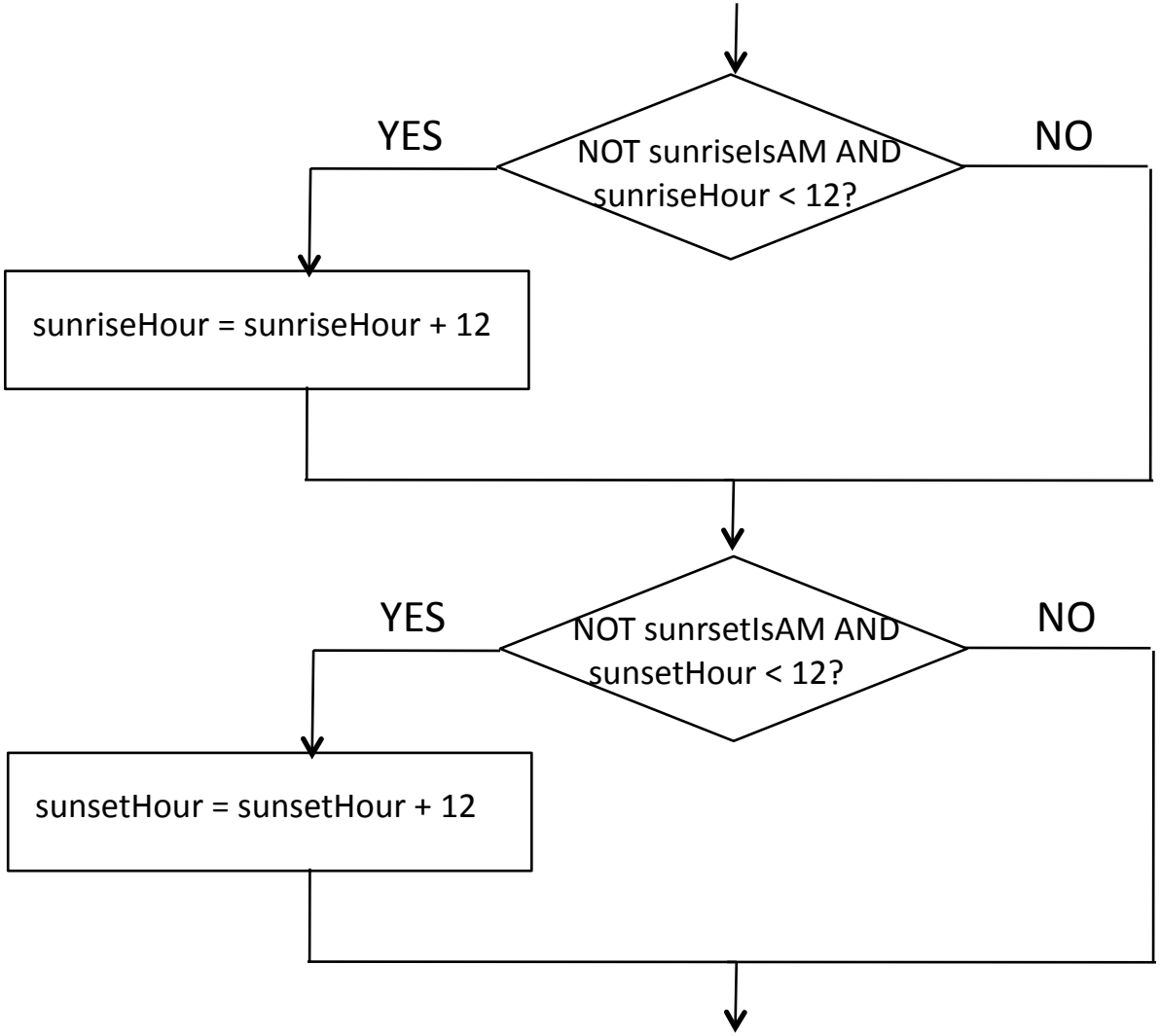


sunsetIsAM is a boolean

Continued….

Sample Flowchart 2

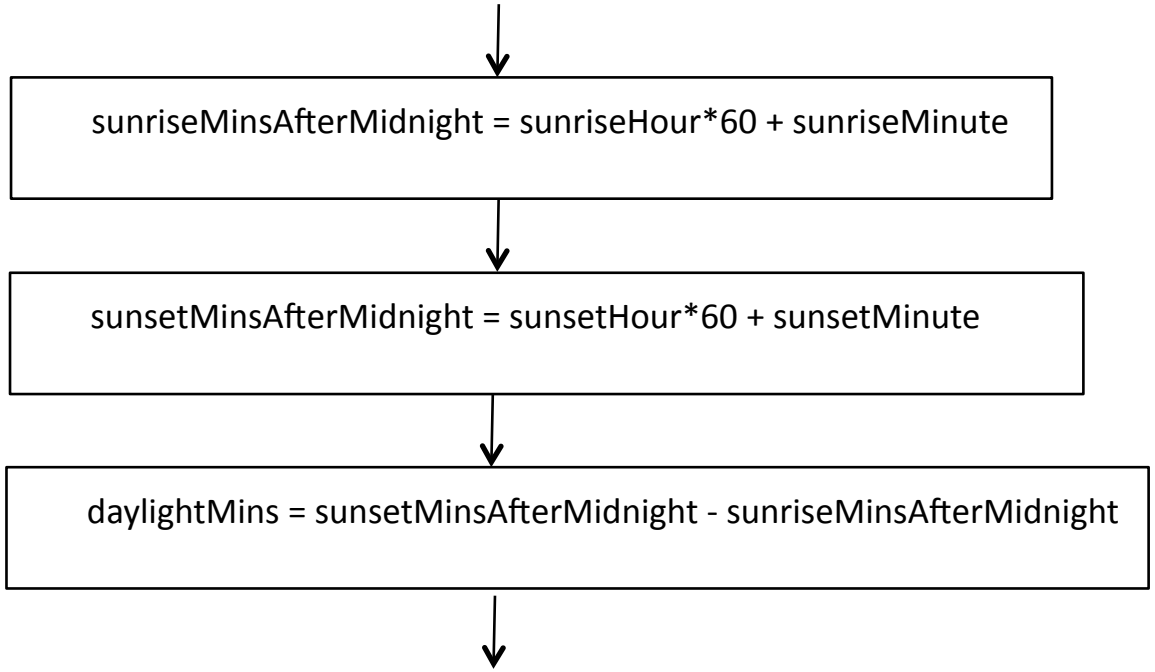
(Continued)



Continued….

Sample Flowchart 2

(Continued)



Continued….

Sample Flowchart 2

(Continued)