Time Class

Problem:
Create a class Time that maintains hours, minutes, and seconds. It must support creating a Time object specified either as hours, minutes, and seconds or as just seconds. The class should also support adding two times, taking the difference between two times, displaying the object in a language-typical way and should format the minutes and seconds as two-digit quantities, and testing two time objects for equality.

<table>
<thead>
<tr>
<th>Step</th>
<th>Pseudocode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>(1) time as hours, minutes, and seconds; (2) time as seconds</td>
</tr>
<tr>
<td>Output</td>
<td>time formatted as h:mm:ss</td>
</tr>
</tbody>
</table>

**Constructor: Time(hours, minutes, seconds)**

1. set class time = time
2. set class hours = hours
3. set class minutes = minutes

**Constructor: Time(seconds)**

2. set class hours = seconds / 3600
3. seconds = seconds mod 3600 (remove the hours from seconds)
4. set class minutes = seconds / 60
5. set class seconds = seconds mod 60 (remove minutes from seconds)

**add / operator+**

6. set lhsS = (lhs hours * 60 + lhs minutes) * 60 + lhs seconds
7. set rhsS = (rhs hours * 60 + rhs minutes) * 60 + rhs seconds
8. set localTime = new Time object (lhsS + rhsS) [constructor 2]
9. return localTime

**sub / operator-**

10. set lhsS = (lhs hours * 60 + lhs minutes) * 60 + lhs seconds
11. set rhsS = (rhs hours * 60 + rhs minutes) * 60 + rhs seconds
12. set localTime = new Time object (lhsS - rhsS) [constructor 2]
13. return localTime
### toString (Java)

14 set f = new NumberFormat object

15 set the minimum number of integer digits for f to 2

16 convert hours to a String

17 format minutes and seconds into Strings using the NumberFormat class’s format method (call the method through object f)

18 concatenate and return all of the strings separated by “:”

### equals (Java)

19 if the lhs and rhs objects are the same, return true

20 if the parameter object is null, return false

21 if the parameter object is not an instance of Time, return false

22 if lhs hours equals rhs hours and lhs minutes equals rhs minutes and lhs seconds equals rhs seconds return true, else return false

### operator<< (C++)

23 set cur_fill = current fill character

24 set the fill character to “0”

25 write hours
write “:”
write minutes in a field 2 characters wide
write “:”
write seconds in a field 2 characters wide

26 restore the previous fill character

27 return the parameter stream object

### operator== (C++)

28 if the lhs object and the rhs object are the same, return true

29 if lhs hours equals rhs hours and lhs minutes equals rhs minutes and lhs seconds equals rhs seconds return true, else return false