Design flaw in Microwave system

Device chosen: Microwave

Violated Universal Principle:

Constraints checks are not properly implemented.

Problem:

The two pictures given above show the control system of a microwave. The problem I found in this system is that it allows the user to enter value greater than 59 in the seconds field. It must be validated. The system must not accept an input if the value is greater than 59 for the seconds field.

In the first example even though, the system takes the wrong input (the seconds value goes all the way to 99 instead of going to 59), it intelligently converts the given time to 11:39 by adding the extra 39 seconds to 11 minutes when the user presses the start button. But in the second example it can't do the same because there is no space for three digits (for the minutes part) in the LED display. It can only accommodate two digits.

Solution:

The correct way of implementing the first scenario is that the system should immediately convert the time that is 10:99 to 11:39 before user presses the start button to use the microwave. Currently this conversion happens only after user presses the start button which is a design flaw.

For the second example, the system should not allow the user to enter values grater then 59 in the seconds' field whenever the user enters 99 in the minutes field.

The generic solution for both cases is that irrespective of the minute value the system should not allow the user to enter value greater than 59 in the seconds field.