

3. round(n) where n is any real number

We will assume that we have the ability to truncate (see Problem 3 for the complete breakdown)

Main task: Determine the nearest integer to n

```
T01: Define T as truncate(n)
T02: Define F as n - T
T03: If n>=0, T04-T05
    T04: If F>=0.5, T05
        T05: Define result as T+1
T06: If n<0, T07-T08
    T07: if F<=-0.5, T08
    T08: Define result as T-1
```

Note that we are using the simplified rounding of rounding up at 0.5.

An alternative

Main task: Determine the nearest integer to n

```
T01: Add 0.5 to |n|
T02: Truncate T01 result
T03: If n < 0, multiply T02 result by -1
```

As in the first solution, we have some tasks which could be broken down: T01 & T02. How would you determine absolute value? How would you break down "truncate"?

Complete breakdown for truncate, absolute value, floor, and round using the Standard Format:

truncate(N) :

```
T01: DEFINE "count" as -1
T02: DEFINE "number" as N

T03: DEFINE add 1 to "count"
T04: DEFINE "number" as number/10
T05: REPEAT while abs(number)>1, T03-T04

T06: DEFINE "place" as count
T07: DEFINE "number" as N
T08: REPEAT while place>=0, T09-T11
    T09: REPEAT while abs(number) > 10^place, T10
        T10: DEFINE "number" as number - 10^place
        T11: DEFINE subtract 1 from "place"

T12: DEFINE "result" as N - number
```

abs(N) :

```
T01: DEFINE: "result" as N
T02: TEST: if result < 0, T03
T03: DEFINE: "result" as -1*result
```

floor(N) :

```
T01: DEFINE: "result" as truncate(N)
T02: TEST: if N<0, T03
T03: DEFINE: "result" as result-1
```

round(N) :

```
T01: TEST: if N>=0, T02-T08
T02: DEFINE: "Lo" as truncate(N)
T03: DEFINE: "Hi" as Lo + 1
T04: DEFINE: "Rem" as N - Lo
T05: TEST: if "Rem" >= 0.5, T06
T06: DEFINE: "result" as Hi
T07: TEST: if Rem < 0.5, T08
T08: DEFINE: "result" as Lo

T09: TEST: If N<0, T10-T16
T10: DEFINE: "Hi" as truncate(N)
T11: DEFINE: "Lo" as Hi - 1
T12: DEFINE: "Rem" as N - Lo
T13: TEST: if "Rem" <= -0.5, T14
T14: DEFINE: "result" as Lo
T15: TEST: if Rem > -0.5, T16
T16: DEFINE: "result" as Hi
```

4. Lock the door

Main Task: Secure the door such that only authorized opening of the door can easily occur.

T01: TEST: If the locking mechanism is a double-keyed deadbolt, T02-T07

T02: Close the door from the side where you desire to remain

T03: Insert key into lock

T04: Rotate key in lock clockwise to stopping point

T05: If door opens without use of key, T06-T07

T06: Close door

T07: Rotate key in lock counter-clockwise to stopping point

T08: TEST: If the locking mechanism is a chain-lock, T09-T11

T09: Close the door from the chain-lock side

T10: Insert end of chain into chain-lock bracket hole

T11: Slide chain to furthest position away from bracket hole

Note that there are many more kinds of locks with their own breakdown of steps.

5. Set the clock

Main Task: Adjust the clock display to show the desired time

T02: If the clock is analog, T03

T03: Rotate minute hand until both minute hand and hour hand reflect the desired time

T04: If clock is digital, do T05-T09

T05: If clock has at an overall forward adjustment button, T06

T06: Press and hold forward adjustment button until desired time is displayed

T07: If clock has hours and minutes adjustment buttons, T08-T09

T08: Press and hold hour adjustment button until displayed hour digits are as desired

T09: Press and hold minute adjustment button until displayed minute digits are as desired

Note that providing only one step (e.g. change the display) is not a solution to the problem since the real work of the problem is determining the mechanism for changing the display.

Note that we are providing solutions for more than one instance of the problem but this does not attempt to solve every possible clock type. For an all-encompassing solution, the missing instance would have their own adjustment method which would need to be included.