PRESSURE CONTROLLING SYSTEM
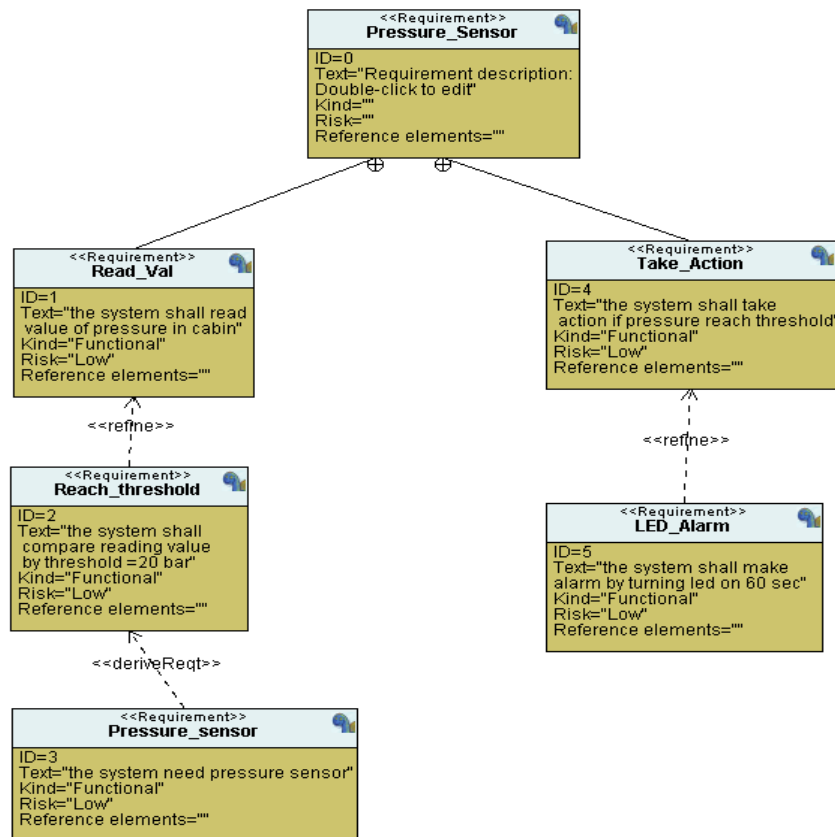
[Report]

AHMED ALI MOHAMED

Learn in Depth

System Requirements
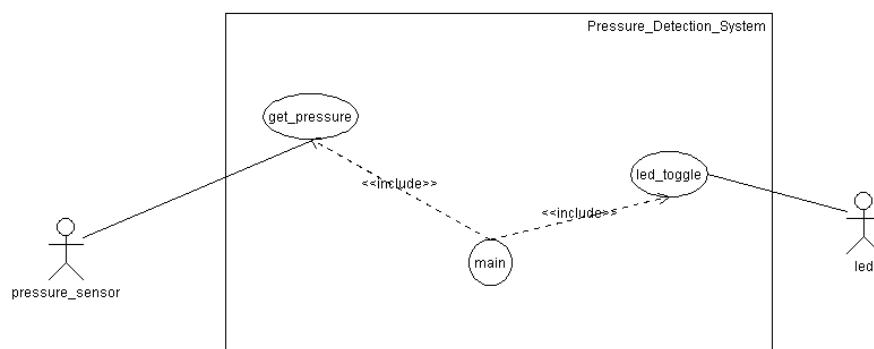

System hardware partitioning
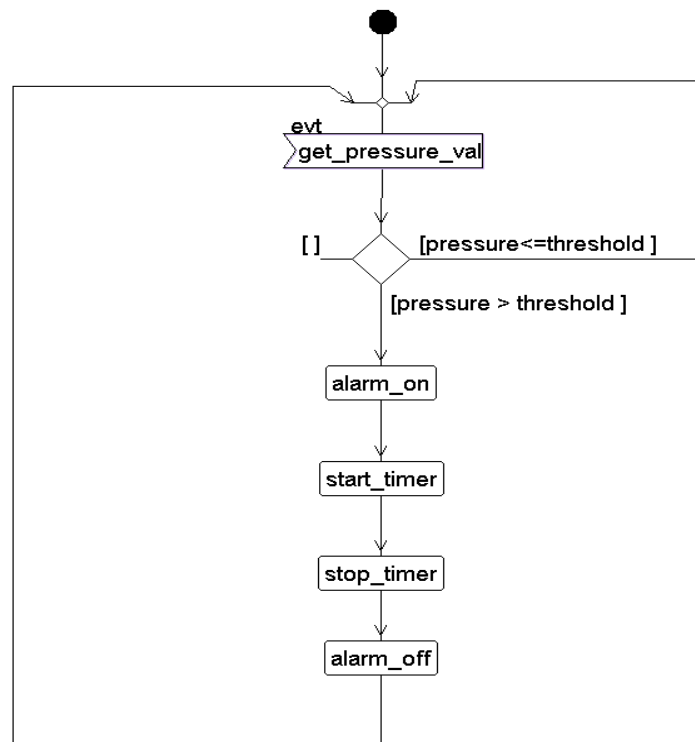- o Stm32f103c6(cortex-m3)

System Analysis
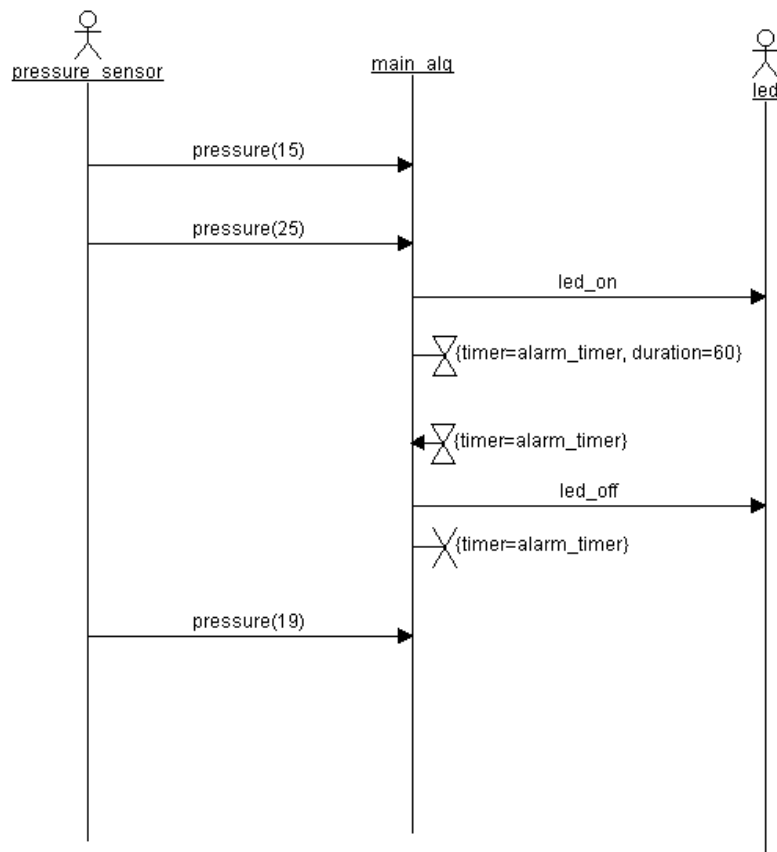- o Use case study

o Activity Diagram

```
                              ●
                              │
                              ▼
        ┌────────────►◇◄──────────────────────────────┐
        │            ┌─evt──────────┐                  │
        │            ├─get_pressure_val               │
        │            └──────┬───────┘                  │
        │                   ▼                          │
        │      [ ]       ◇      [pressure<=threshold ] │
        │                 │                            │
        │        [pressure > threshold ]               │
        │                 ▼                            │
        │            ┌──────────┐                      │
        │            │ alarm_on │                      │
        │            └────┬─────┘                      │
        │                 ▼                            │
        │            ┌───────────┐                     │
        │            │start_timer│                     │
        │            └────┬──────┘                     │
        │                 ▼                            │
        │            ┌───────────┐                     │
        │            │stop_timer │                     │
        │            └────┬──────┘                     │
        │                 ▼                            │
        │            ┌──────────┐                      │
        │            │ alarm_off│                      │
        │            └────┬─────┘                      │
        │                 │                            │
        └─────────────────┘
```

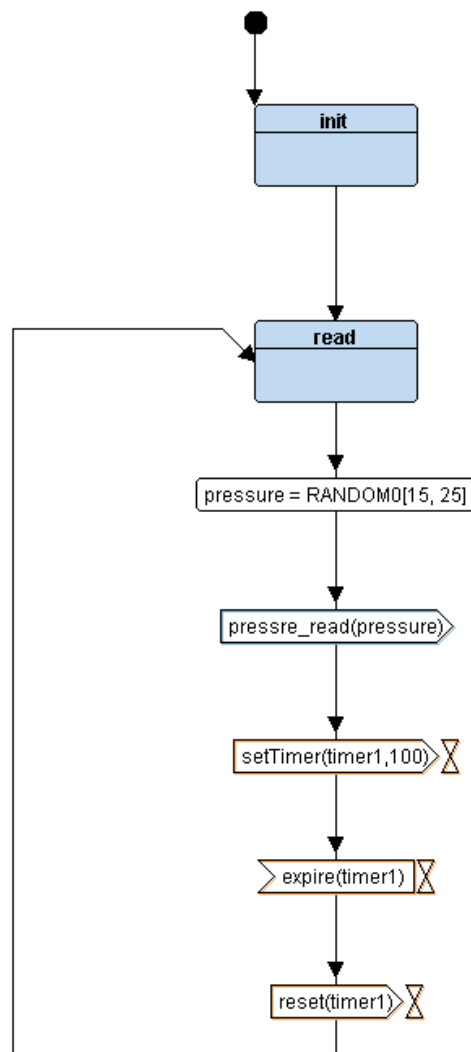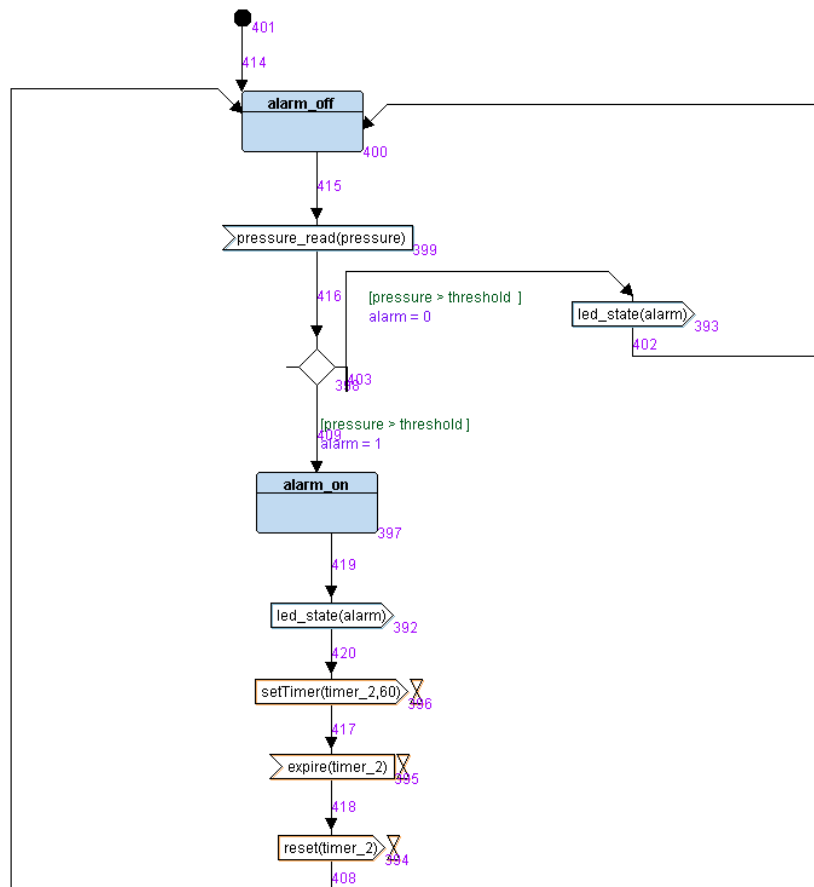o Sequence Diagram

System Design

o PS Diagram

o Pressure Detection

```
                    ● 401
                    │ 414
                    ▼
            ┌──────────────┐
  ┌────────▶│  alarm_off   │◀──────────────────────────┐
  │         └──────────────┘ 400                        │
  │                │ 415                                │
  │                ▼                                     │
  │      ⟩pressure_read(pressure)⟩ 399                  │
  │                │ 416        [pressure > threshold ] │
  │                │             alarm = 0              │
  │                │                    ⟩led_state(alarm)⟩ 393
  │                ▼                         402
  │              ◇ 398 403
  │                │ 409   [pressure > threshold ]
  │                │       alarm = 1
  │                ▼
  │          ┌──────────────┐
  │          │   alarm_on   │
  │          └──────────────┘ 397
  │                │ 419
  │                ▼
  │          ⟩led_state(alarm)⟩ 392
  │                │ 420
  │                ▼
  │          ⟩setTimer(timer_2,60)⟩ 396
  │                │ 417
  │                ▼
  │          ⟩expire(timer_2)⟩ 395
  │                │ 418
  │                ▼
  │          ⟩reset(timer_2)⟩ 394
  │                │ 408
  └────────────────┘
```

o LED

```
                    ● 377
                    │ 389
                    ▼
            ┌──────────────┐
            │     init     │
            └──────────────┘ 376
                    │
                    ▼
            ⟩led_state(alarm)⟩ 375
                    │ 390
                    ▼
                   ◇ 374
      [alarm ==1 ] 385        381 [ alarm == 0]
          │                         │
          ▼                         ▼
    ┌──────────┐              ┌──────────┐
    │  led_on  │              │ led_off  │
    └──────────┘ 373          └──────────┘ 372
```