**Moving Car System Design**

**System layered architecture:**

* Application
* ECUAL: Electronic Unit Application Layer, For Drivers
* MCAL: Microcontroller Application Layer
* Microcontroller

**Specify system modules/drivers**

* Motor (4 Motors) - ECUAL
* Button (2 Buttons) - ECUAL
* LED (4 LEDs) - ECUAL
* Timer - MCAL
* DIO - MCAL
* PWM - MCAL

API’s

DIO

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| EN\_DIO\_ERROR\_t DIO\_init(ST\_DIO\_config\_t \* configurations); EN\_DIO\_ERROR\_t DIO\_write(ST\_DIO\_config\_t \*configurations , uint8\_t data); EN\_DIO\_ERROR\_t DIO\_read(ST\_DIO\_config\_t \*configurations , uint8\_t \*data); EN\_DIO\_ERROR\_t DIO\_toggle(ST\_DIO\_config\_t \*configurations); |

Timer

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| EN\_timer\_error\_t timer\_init(timer\_configuration\_t \*timer\_configuration);  EN\_timer\_error\_t timer\_init\_callback\_OVF(**void** (\*callback)(**void**));  EN\_timer\_error\_t timer\_init\_callback\_COMP(**void** (\*callback)(**void**)); |

Motors

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| EN\_DC\_motor\_error\_t motor\_initialize(**const** dc\_motor\_config\_t \*dc\_motor);  EN\_DC\_motor\_error\_t motor\_turn\_on(dc\_motor\_config\_t\ \*dc\_motor,EN\_DC\_motor\_direction\_t dc\_motor\_direction );  EN\_DC\_motor\_error\_t motor\_stop(dc\_motor\_config\_t \*dc\_motor);  EN\_DC\_motor\_error\_t motor\_set\_speed(dc\_motor\_config\_t \*dc\_motor, uint8\_t dc\_motor\_speed); |

LED

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| EN\_LED\_status\_t led\_init(ST\_LED\_config\_t \*led);  EN\_LED\_status\_t led\_turn\_on(ST\_LED\_config\_t \*led);  EN\_LED\_status\_t led\_turn\_off(ST\_LED\_config\_t \*led);  EN\_LED\_status\_t led\_toggle(ST\_LED\_config\_t \*led); |

Button

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| --- |
| EN\_button\_error\_t button\_init(**const** EN\_button\_t\* btn);  EN\_button\_error\_t button\_read\_state( EN\_button\_t \*btn, EN\_button\_state\_t \*btn\_state); |