Use Cases Categories:

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| **ID** | **Use Case** | **Priority (H,M,L)** | **Category** |
| UC1 | User makes a MoveForwardcommand | High | Control |
| UC2 | User makes a MoveBackwardcommand | High | Control |
| UC3-1 | User makes a TurnLeftcommand | High | Control |
| UC4-1 | User makes a TurnRightcommand | High | Control |
| UC5 | User presses the Emergency button | High | Emergency |
| UC6 | User initiates the robot | High | Communication & Control |

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| **Use Case ID** | **1** |
| Use Case | User makes a MoveForwardcommand |
| Category | Control |
| Brief description | User wants the robot to move forward by typing MoveForward(X) in the console. |
| Pre-conditions | * The code is complied. * The robot is connected with user’s laptop. * The battery is fully charged. |
| Scenario | 1. The code sends MoveForward(X) in the format of “YY ID Parameter FF FF ZZ” via serial to the robot controller. 2. The robot controller receives the message packets and decodes the command ID and parameter. 3. The robot controller constructs an acknowledgement packet “AA BB AA BB”. 4. The robot controller sends the acknowledgement packet back to the user laptop via serial. 5. Robot sends PWM signal X to the left and right motors. 6. Left motor and right motor move with X speed. 7. The robot moves forward for X/1000 seconds. |
| Post-conditions | * The program is terminated. * The robot is stopped. |
| Priority | High |

Use Cases:

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| **Use Case ID** | **2** |
| Use Case | User makes a MoveBackward command |
| Category | Control |
| Brief description | User wants the robot to move backward by typing MoveBackward(X) in the console. |
| Pre-conditions | * The code is complied. * The robot is connected with user’s laptop. * The battery is fully charged. |
| Scenario | 1. The code sends MoveBackward(X) in the format of “YY ID Parameter FF FF ZZ” via serial to the robot controller. 2. The robot controller receives the message packets and decodes the command ID and parameter. 3. The robot controller constructs an acknowledgement packet “AA BB AA BB”. 4. The robot controller sends the acknowledgement packet back to the user laptop via serial. 5. Robot sends PWM signal X to the left and right motors. 6. Left motor and right motor move with -X speed. 7. The robot moves backward for X/1000 seconds. |
| Post-conditions | * The program is terminated. * The robot is stopped. |
| Priority | High |

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| **Use Case ID** | **3-1** |
| Use Case | User makes a TurnLeft command |
| Category | Control |
| Brief description | User wants the robot to move backward by typing TurnLeft(X) in the console. |
| Pre-conditions | * The code is complied. * The robot is connected with user’s laptop. * The battery is fully charged. |
| Scenario | 1. The code sends TurnLeft(X) in the format of “YY ID Parameter FF FF ZZ” via serial to the robot controller. 2. The robot controller receives the message packets and decodes the command ID and parameter. 3. The robot controller constructs an acknowledgement packet “AA BB AA BB”. 4. The robot controller sends the acknowledgement packet back to the user laptop via serial. 5. Robot sends PWM signal X to the left and right motors. 6. Left motor moves with -X speed and right motor moves with X speed. 7. The robot turns left for X/1000 seconds. |
| Post-conditions | * The program is terminated. * The robot is stopped. |
| Priority | High |

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| **Use Case ID** | **4-1** |
| Use Case | User makes a TurnRight command |
| Category | Control |
| Brief description | User wants the robot to move backward by typing TurnRight(X) in the console. |
| Pre-conditions | * The code is complied. * The robot is connected with user’s laptop. * The battery is fully charged. |
| Scenario | 1. The code sends TurnRight(X) in the format of “YY ID Parameter FF FF ZZ” via serial to the robot controller. 2. The robot controller receives the message packets and decodes the command ID and parameter. 3. The robot controller constructs an acknowledgement packet “AA BB AA BB”. 4. The robot controller sends the acknowledgement packet back to the user laptop via serial. 5. Robot sends PWM signal X to the left and right motors. 6. Left motor moves with X speed and right motor moves with -X speed. 7. The robot turns right for X/1000 seconds. |
| Post-conditions | * The program is terminated. * The robot is stopped. |
| Priority | High |

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| **Use Case ID** | **5** |
| Use Case | User presses the Emergency button |
| Category | Emergency |
| Brief description | The robot is almost bump into human or object. The user presses the emergency button to force the robot to stop immediately. |
| Pre-conditions | * The robot is moving closed to human or object. * The robot does not appear to stop soon. |
| Scenario | 1. User presses the emergency button. 2. The robot is stopped. |
| Post-conditions | * The robot is stopped. |
| Priority | High |

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| **Use Case ID** | **6** |
| Use Case | User initiates the robot |
| Category | Communication |
| Brief description | The indicators light up when the robot is initiated and connected with a laptop. |
| Pre-conditions | * The robot is not connected with user’s laptop. * The robot does not powered on. |
| Scenario | 1. User turns on the power switch. 2. A blue LED lights up. 3. The user connects the laptop with the robot. 4. A green LED lights up. |
| Post-conditions | * The robot is powered on. * The laptop is connected to the robot. |
| Priority | High |

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| **Revision** | **Date** | **Author** | **Comments** |
| 0.1 | 2016/1/31 | Liwen | First draft of the basic six use cases. |

Document Revisions: