COSPACE RESCUE

How to use C code

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Objectives

- To understand the CoSpace Rescue GUI and C correlation
- To load C code in CoSpace Rescue

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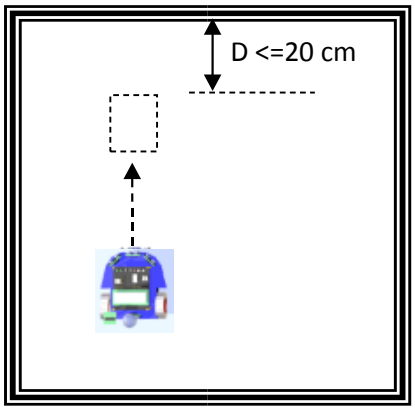
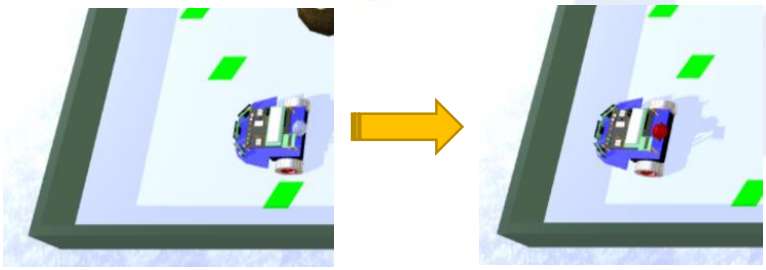
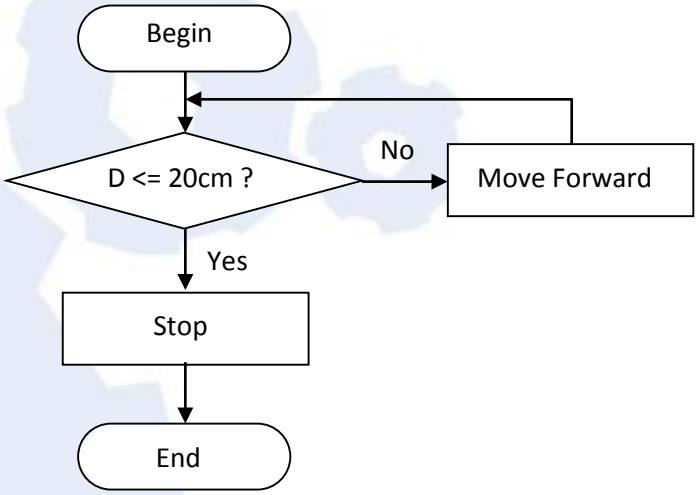
1. Write a code using GUI - A robot stops when it approaches a wall

Program a robot to move forward (both wheel speed = 3) in WORLD_1. The robot will stop if it detects an obstacle 20cm away.





Flowchart:



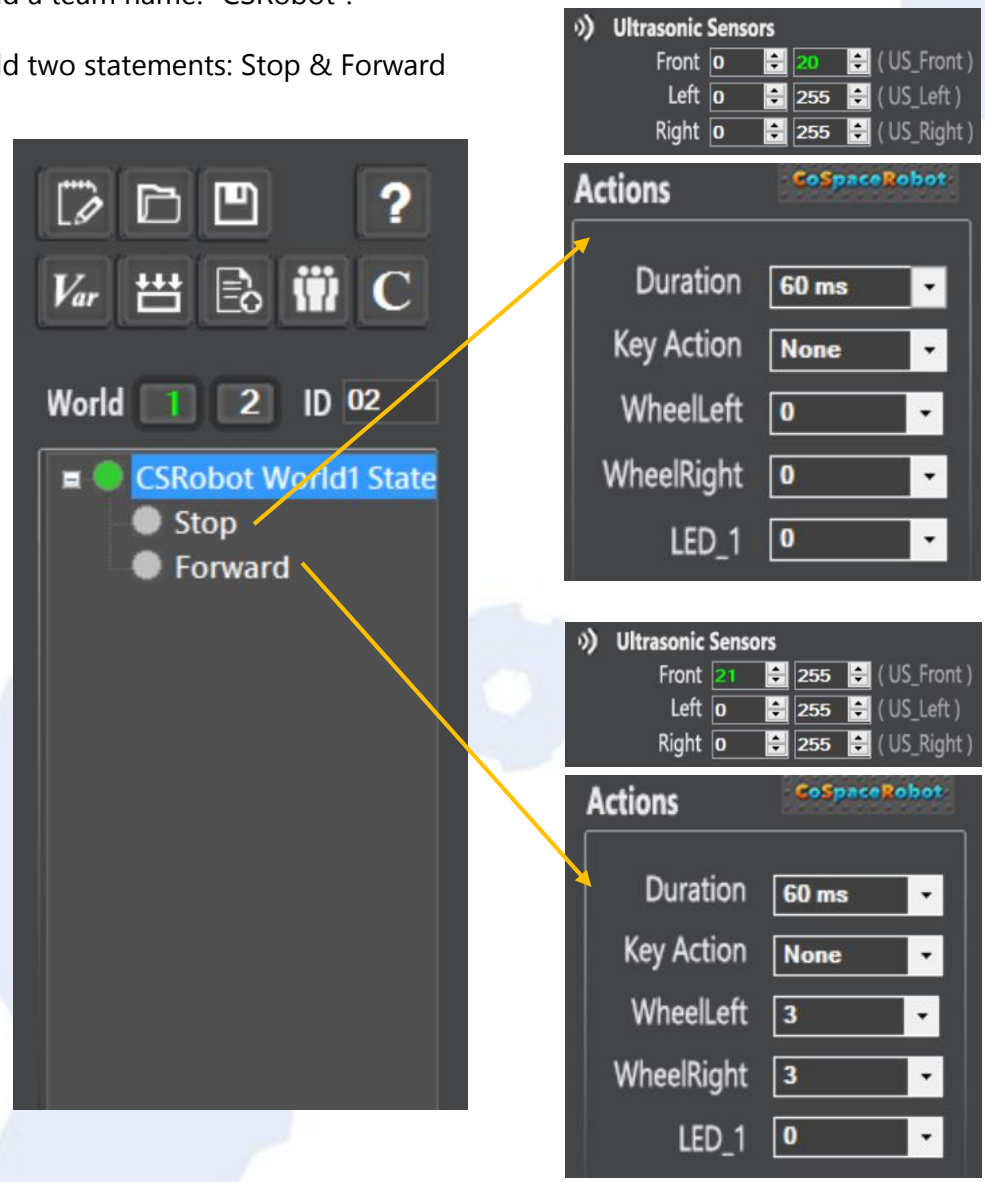
Analysis:

The robot has two actions – Moving forward and Stop. Therefore, two statements need to be added:

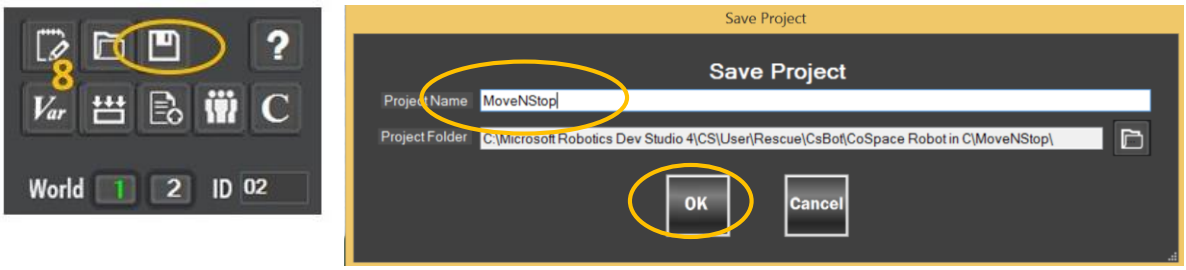
- 1st statement: The robot will stop if the front ultrasonic sensor reading is less than 20 cm
- 2nd statement: The robot moves forward if the 1st statement is not executed.

Procedure:

1. Launch CSR-Rescue (Primary).
2. Launch "AI" and select "WORLD_1.
3. Define a new project: **MovingNStop.**
4. Add a team name: "CSRobot".
5. Add two statements: Stop & Forward



6. Save the project.



7. Build the project.
8. Load the “MoveNStop.dll” to the RED robot and monitor its performance.

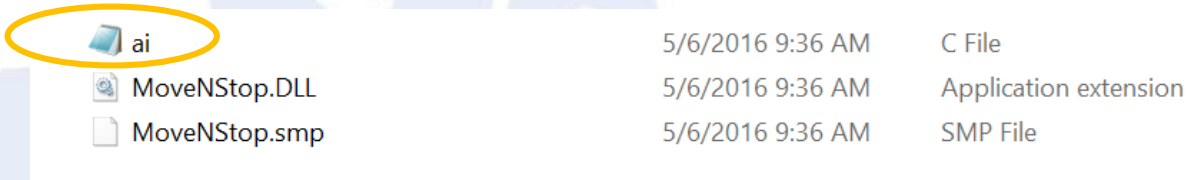
2. CoSpace Rescue GUI and C correlation

You can read the respective C code after programing in GUI.

1. Launch CSR-Rescue (Primary).
2. Open project: MoveNStop.
3. You can open the C code using any one of the following methods:
   - Click on  and open the C code with Notepad.
   - Alternatively, you can open the C code with other tools, such as notepad++, c compiler, etc.

     The C code is in the following directory:

     C:\Microsoft Robotics Dev Studio 4\CS\User\Rescue\CsBot\MoveNStop



ai	5/6/2016 9:36 AM	C File
MoveNStop.DLL	5/6/2016 9:36 AM	Application extension
MoveNStop.smp	5/6/2016 9:36 AM	SMP File

4. Check out the last segment (Game 0) of the ai.c file, we will see

```
void Game0()
{

    if(SuperDuration>0)
    {
        SuperDuration--;
    }
    else if(Duration>0)
    {
        Duration--;
    }
    else if(US_Front>=0 && US_Front<=20)          /*Case 1*/
    {
        Duration = 0;
        CurAction =1;
    }
    else if(US_Front>=21 && US_Front<=255)        /*Case 2*/
    {
        Duration = 0;
        CurAction =2;
    }
    switch(CurAction)
    {
        case 1:
            WheelLeft=0;
            WheelRight=0;
            LED_1=0;
            MyState=0;
            break;
        case 2:
            WheelLeft=3;
            WheelRight=3;
            LED_1=0;
            MyState=0;
            break;
        default:
            break;
    }

}
```

Case 1 is related to the statement “Stop”

Case 2 is related to the statement “Forward”

3. My first C programme

Send a message in the command window

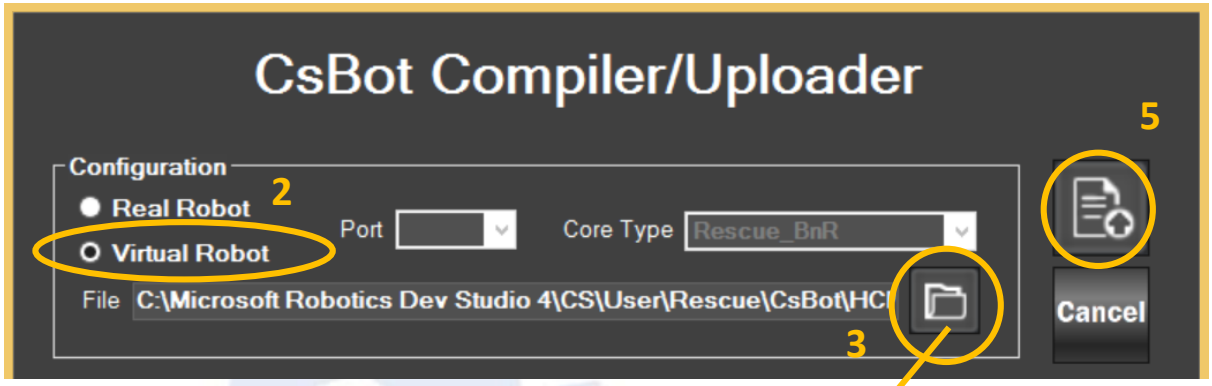
1. Open the **ai.c** in the "MoveNStop" folder (using notepad, notepad++, etc)
2. Modify the following segment accordingly (add the highlighted sentences).

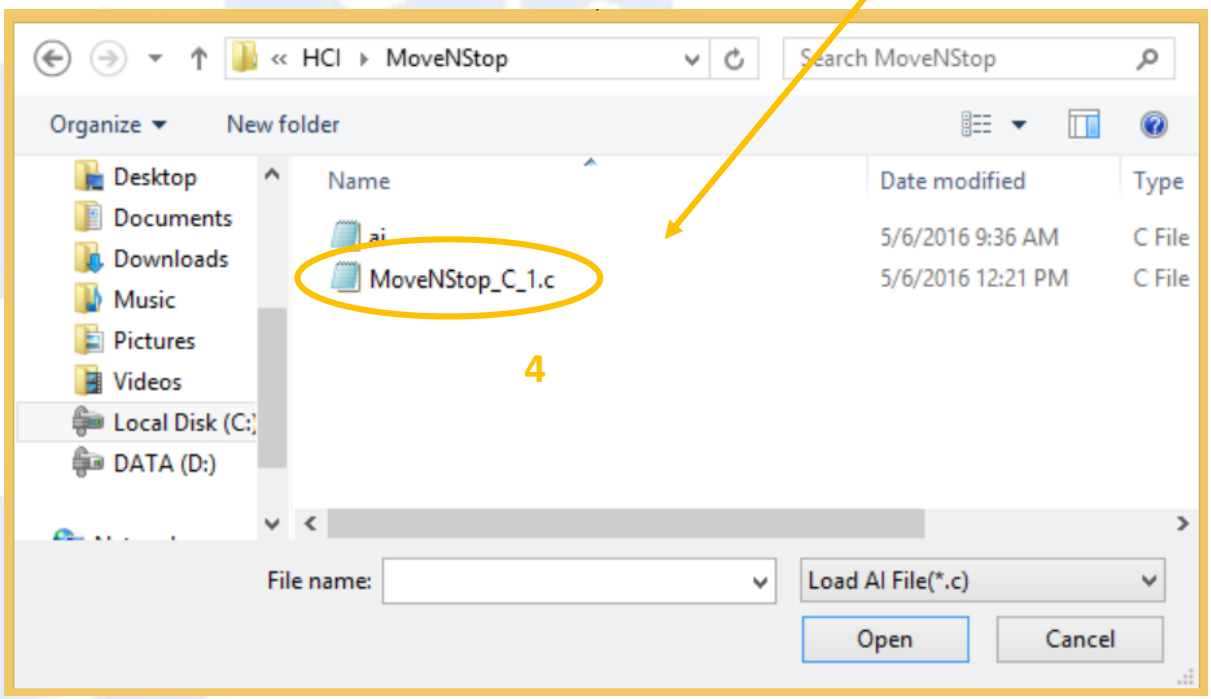
```
void Game0()
{

    if(SuperDuration>0)
    {
        SuperDuration--;
    }
    else if(Duration>0)
    {
        Duration--;
    }
    else if(US_Front>=0 && US_Front<=20)        /*Case 1*/
    {
        Duration = 0;
        CurAction =1;
        printf("\n Stop:");
    }
    else if(US_Front>=21 && US_Front<=255)      /*Case 2*/
    {
        Duration = 0;
        CurAction =2;
        printf("\n Forward:");
    }
    switch(CurAction)
    {
        case 1:
            WheelLeft=0;
            WheelRight=0;
            LED_1=0;
            MyState=0;
            printf("   Wheel_Left = %d " , WheelLeft);
            printf("  Wheel_Right = %d " , WheelRight);
            break;
        case 2:
            WheelLeft=3;
            WheelRight=3;
            LED_1=0;
            MyState=0;
            printf("   Wheel_Left = %d " , WheelLeft);
            printf("  Wheel_Right = %d " , WheelRight);
            break;
        default:
            break;
    }

}
```

3. Save the file as "**MoveNStop_C_1.c**". (note that the file type must be **.c**)

4. Launch CSR-Rescue (Primary).

5. Launch the AI panel and click on "Upload" icon.

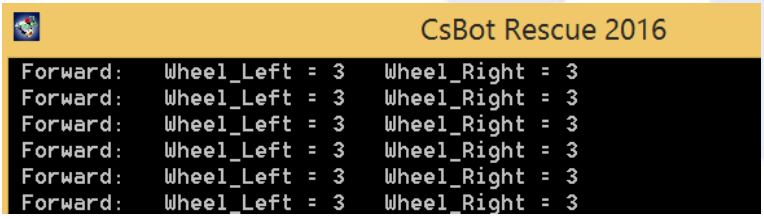


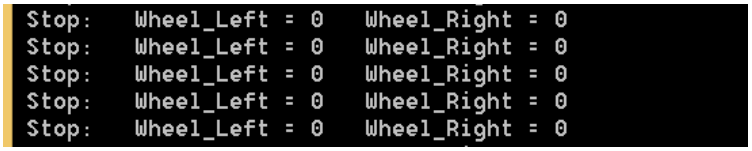


6. Load “MoveNStop_C_1.DLL” to a BLUE or RED virtual robot.

7. Start the simulator and monitor the robot’s performance.

You will notice that the following message will be displayed as robot moves.





4. Code editor

You can use the following tools to edit the C code:

NotePad, NotePad ++, WordPad, Sublime Text 3, etc

5. Compiler

The C code **has to be** built into .DLL type using build-in complier in CoSpace Rescue program. All other compiler cannot be used.

6. Sample Code

A sample program “**C Code Sample**” is attached for your reference