Write a simple C/C++ Program that reads a tab-separated data file(attached) consisting of distance(D\_sense) and angle(theta\_sense) object measurements, then translates that information into robot-centric Cartesian coordinates (Px\_robot and Py\_robot), and then into world coordinates given the following robot pose:

|  |  |
| --- | --- |
| Robot\_X: | 12 |
| Robot\_Y: | 4 |
| Robot\_θ: | -0.7854 |

All angle measurements are given in ***radians***.

Your program should then save all information (object distance and angle, robot-centric coordinates, and world coordinates) to a tab-separated text file.

For example, for the measurement D\_sense = 9.055385138 and theta\_sense = 3.816333596, the output should look like this:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| D\_sense | Theta\_sense | Px\_robot | Py\_robot | Px\_world | Py\_world |
| 9.055385138 | 3.816333596 | -7.07107 | -5.65685 | 3 | 5 |

Column headings do not need to be repeated for each point, only once at the top of the program.

Your code should be well designed, well commented, and well-structured such that it is portable and usable across many different situations. Keep in mind that this is code that will someday (soon) take readings from live sensor data instead of a file.

Email your code project files and your processed data file to your instructor.