**Homework 3 – Question 1**  
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Exercise 3.1:

The aspect we chose to improve is the sampling method.

*prm\_basic.py*: The basic sampling method is to randomly select landmarks inside a scene’s bounding-box and verify each landmark is valid, do so until *num\_landamrk* landmarks have been chosen. These are the algorithm’s landmarks.

The main disadvantage of this method occurs when there are narrow passages. The probability of sampling points inside narrow passages decreases as the passage becomes narrower.

We implemented a ‘Gaussian sampling’ method based on *“The Gaussian Sampling Strategy for Probablistic Roadmap Planners”* (Boor, Overmas, van der Strappen).

*our\_prm\_gaussian\_sampling.py:* The sampling method:  
We randomly sample a point, if it is valid we ignore it and sample another point.  
So we now have a non-valid point. We sample another point from a normal distribution centered at the current invalid point. If the new sampled point is valid – We add it to our set of landmarks.

This sampling method promotes points that are near obstacles, therefor the probability of sampling points near narrow passages increases.