**Task for examples 3.1 and 3.2**

**Example 3.1.**

A problem is being solved: for a certain goal 4 independent shots are fired, each of which hits it with p=0.5. At least two hits are required to hit the target. Determine the probability of hitting the target.

Solve **Example 3.1** using the Monte Carlo method.

**Additional task for example 3.1**

1) Each shot hits the target with probability p=0.25. At least two hits are required to hit the target. Determine the probability of hitting the target.

2) Each shot hits the target with probability p=0.75. At least two hits are required to hit the target. Determine the probability of hitting the target.

**Example 3.2.** Analysis of the behavior of a discrete object (discrete input and output variables) - “problem about drunken passerby or the random walk problem.”

A passerby decided to take a walk while standing on a street corner.

Let the probability that, upon reaching the next intersection, he will go north, south, east and west, be the same.

What is the probability that after walking 10 blocks, a passerby will end up no further than 2 blocks from the place where he started his walk.

Let us denote its location at each intersection by a two-dimensional vector (x1, x2) (“exit”), where x1 is the direction from east to west and x2 is the direction from north to south. Each move is one block east (x1 + 1), and each move is one block west (x1 – 1) (x1 is a discrete variable). North x2 + 1, south x2 – 1. Initial position (0,0). If at the end of the walk the absolute values of x1 and x2 are greater than 2, then we will assume that he has gone further than two blocks at the end of a walk of 10 blocks. Because the probability of our passerby moving in any of the 4 directions according to the condition is the same and equal 0.25, then you can estimate its movement using random number generator.

Let us agree that if a random number (RN) lies in range from 0 to 24, the drunk will go east and we increase x1 by 1; if from 25 to 49, then he will go west and x1-1; if from 50 to 74, he will go north and x2 + 1; if from 75 to 99, then south and x2 – 1.

**Additional task for example 3.2**

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| Variant | % | % | % | Variant | % | % | % |
| **1** |  | **20** |  | **2** |  | **15** |  |
| **30** |  | **20** | **35** |  | **15** |
|  | **30** |  |  | **35** |  |
| **3** |  | **20** |  | **4** |  | **15** |  |
| **20** |  | **30** | **15** |  | **35** |
|  | **30** |  |  | **35** |  |
| **5** |  | **30** |  | **6** |  | **35** |  |
| **20** |  | **30** | **15** |  | **35** |
|  | **20** |  |  | **15** |  |
| **7** |  | **30** |  | **8** |  | **35** |  |
| **30** |  | **20** | **35** |  | **15** |
|  | **20** |  |  | **15** |  |
| **9** |  | **10** |  | **10** |  | **25** |  |
| **10** |  | **40** | **30** |  | **10** |
|  | **40** |  |  | **35** |  |
| **11** |  | **10** |  | **12** |  | **25** |  |
| **40** |  | **10** | **10** |  | **30** |
|  | **40** |  |  | **35** |  |
| **13** |  | **40** |  | **14** |  | **35** |  |
| **10** |  | **40** | **10** |  | **30** |
|  | **10** |  |  | **25** |  |
| **15** |  | **40** |  | **16** |  | **35** |  |
| **40** |  | **10** | **30** |  | **10** |
|  | **10** |  |  | **15** |  |