-------------part 1.b-------------

Original array

[73, 16, 18, 27, 43, 60, 20, 88, 20, 74]

permutation 1:

[16, 43, 88, 20, 20, 60, 74, 18, 73, 27]

permutation 2:

[20, 88, 73, 18, 74, 60, 20, 43, 27, 16]

permutation 3:

[60, 88, 73, 20, 43, 16, 27, 18, 20, 74]

permutation 4:

[43, 20, 27, 74, 88, 73, 16, 60, 20, 18]

permutation 5:

[73, 20, 74, 88, 43, 20, 16, 27, 60, 18]

-------------part 2.b-------------

Original array

[47, 3, 33, 91, 18, 63, 44, 10, 79, 2]

permutation 1:

[91, 44, 10, 3, 79, 2, 18, 33, 47, 63]

permutation 2:

[10, 47, 2, 79, 63, 91, 33, 18, 44, 3]

permutation 3:

[79, 2, 91, 3, 63, 18, 47, 10, 44, 33]

permutation 4:

[18, 63, 33, 44, 79, 3, 10, 2, 47, 91]

permutation 5:

[3, 2, 10, 47, 79, 33, 63, 44, 91, 18]

**3.a & b.**

|  |  |  |  |
| --- | --- | --- | --- |
| Permutation index | Permutation | RANDOMIZE-IN-PLACE | PERMUTE-WITH-ALL |
| 0 | 1234 | 1078 | 1087 |
| 1 | 1243 | 1000 | 969 |
| 2 | 1324 | 1025 | 1004 |
| 3 | 1342 | 1034 | 984 |
| 4 | 1423 | 1011 | 956 |
| 5 | 1432 | 976 | 1018 |
| 6 | 2134 | 1043 | 1000 |
| 7 | 2143 | 1064 | 970 |
| 8 | 2314 | 974 | 984 |
| 9 | 2341 | 986 | 1057 |
| 10 | 2413 | 977 | 1014 |
| 11 | 2431 | 1022 | 968 |
| 12 | 3124 | 942 | 1010 |
| 13 | 3142 | 980 | 1057 |
| 14 | 3214 | 977 | 966 |
| 15 | 3241 | 972 | 945 |
| 16 | 3412 | 951 | 999 |
| 17 | 3421 | 1040 | 1025 |
| 18 | 4123 | 1032 | 997 |
| 19 | 4132 | 967 | 996 |
| 20 | 4213 | 1001 | 1042 |
| 21 | 4231 | 969 | 958 |
| 22 | 4312 | 989 | 1005 |
| 23 | 4321 | 990 | 989 |

**(c)**

When we examine the results of randomize-in-place, we see that results are around 1000. So, the distribution of permutations produced by randomize-in-place are close to uniform.

**(d)**

When we examine the results of permute-with-all permutations, they are close to uniform however we would not expect this to be happened. In this question we have opposite of the expectation, the size of the array may be reason for this problem.