**COMP 301**

**Analysis of Algorithms**

**Lab 9 Report**

1. 1. Kl
   2. The output for 5 iterations of *randomize\_in\_place()*

Original array:

[74, 59, 42, 29, 49, 52, 20, 74, 77, 17]

Permutation 1:

[77, 17, 52, 74, 49, 74, 20, 59, 29, 42]

Permutation 2:

[74, 29, 17, 42, 59, 52, 77, 20, 74, 49]

Permutation 3:

[49, 77, 74, 52, 59, 17, 42, 20, 74, 29]

Permutation 4:

[59, 52, 74, 77, 42, 74, 49, 17, 20, 29]

Permutation 5:

[49, 74, 29, 20, 77, 74, 42, 59, 52, 17]

* 1. The output for 5 iterations of *randomize\_with\_all()*

Original array:

[84, 73, 34, 64, 82, 44, 45, 64, 23, 20]

Permutation 1:

[34, 20, 73, 82, 64, 84, 23, 64, 44, 45]

Permutation 2:

[64, 73, 82, 45, 34, 64, 20, 23, 84, 44]

Permutation 3:

[34, 44, 23, 73, 45, 20, 82, 64, 84, 64]

Permutation 4:

[20, 45, 73, 82, 84, 64, 44, 34, 64, 23]

Permutation 5:

[23, 64, 45, 64, 44, 84, 73, 34, 82, 20]

|  |  |  |  |
| --- | --- | --- | --- |
| Permutation index | Permutation | RANDOMIZE-IN-PLACE | PERMUTE-WITH-ALL |
| 0 | 1234 | 990 | 938 |
| 1 | 1243 | 1004 | 972 |
| 2 | 1324 | 1033 | 1035 |
| 3 | 1342 | 998 | 964 |
| 4 | 1423 | 1021 | 1034 |
| 5 | 1432 | 957 | 1046 |
| 6 | 2134 | 1002 | 998 |
| 7 | 2143 | 991 | 951 |
| 8 | 2314 | 1005 | 1069 |
| 9 | 2341 | 928 | 994 |
| 10 | 2413 | 985 | 985 |
| 11 | 2431 | 966 | 1009 |
| 12 | 3124 | 995 | 1063 |
| 13 | 3142 | 1025 | 988 |
| 14 | 3214 | 1004 | 1001 |
| 15 | 3241 | 975 | 995 |
| 16 | 3412 | 1004 | 1003 |
| 17 | 3421 | 1044 | 1010 |
| 18 | 4123 | 1035 | 987 |
| 19 | 4132 | 1037 | 954 |
| 20 | 4213 | 1028 | 1030 |
| 21 | 4231 | 1030 | 1016 |
| 22 | 4312 | 977 | 976 |
| 23 | 4321 | 966 | 982 |

1. All the values for *randomize\_in\_place()* method are close to 1000. Therefore, we can conclude that it is close to uniform.
2. The frequencies for *randomize\_with\_all()* slightly different form the frequencies in part(a) but they are also close to 1000. Therefore we can say that *randomize\_with\_all()* is also close to uniform.