1. In the lecture we showed how to simulate a random permutation of length \( n \), and we wrote a program in True BASIC to do so (see below). This problem consists of rewriting that program in whatever programming environment you choose (Java, R, C++, Matlab, etc.), and illustrating your program by generating a random permutation of length \( n = 104 \). Print out your program code as well as your output, and be sure to state what language you are using. (Note: If your programming language has a “random permutation” feature, don’t use it!)

```
RANDOMIZE
LET n=104
DIM x(104)
FOR i=1 to n
   LET x(i)=i
NEXT i
FOR k=n to 2 step -1
   LET j=int(k*rnd)+1
   LET temp=x(j)
   LET x(j)=x(k)
   LET x(k)=temp
NEXT k
FOR i=1 to n
   PRINT using " ###": x(i);
NEXT i
END
```

66  75  93  56  29  54  85  10  67  81  15  78  68  76  50  92  96  17  91  5
44  77  94  24  53  18  82  71  88  42  70  57  97  89  33  59  43  2  61  35
64  20  14  19  102  101  26  8  87  98  37  65  1  58  7  84  27  72  62  30
63  49  13  23  51  48  99  28  32  79  39  6  103  36  104  60  47  95  22  45
74  100  41  31  46  90  11  40  52  69  25  83  3  80  34  4  9  38  12  86
55  73  16  21

2. Simulate the expected number of dice rolls in a craps game. (Rules: Roll a pair of dice. If a total of 2, 3, 7, 11, or 12 appears on the initial roll, stop. If a total of 4, 5, 6, 8, 9, or 10 appears on the initial roll, continue to roll the dice until you repeat the initial total or roll a total of 7.) Estimate the expected number of rolls required and calculate the standard error of your estimate. Sample size should be at least 1,000,000.