



You will use the random number generator on the TI-84 Plus CE to create some computer-generated 'music'.

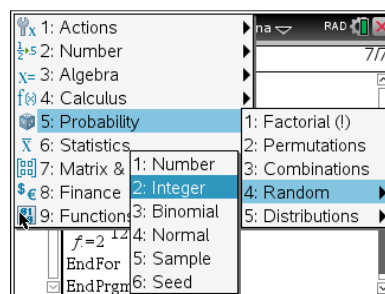
#### Objectives:

- Use the **For** loop to control the number of notes
- Use the random number generator to create random musical notes

Your task is to complete a program that asks for the number of notes to play, and then uses a **For** loop to play the given number of random notes. As the note is being played, the frequency should be displayed on the calculator screen using **Disp**.

In this application, we will use the **randInt( )** function of the TI-Nspire to generate a random note on the musical scale.

1. From the Calculator app, locate **randInt( )** on **menu > Probability > Random > Integer**.
  - This command takes two (or three) arguments.
2. Enter a lower and upper value separated by a comma, and press enter.
3. From then on, just up-arrow to the previous command, press enter to reuse it, and edit the two arguments to see the output of the function.



You will combine this **randInt( )** function with our musical notes formula to get the program to generate random notes based on the  $2^{1/12}$  relationship between the notes.

The important new part of the code is:

$$n := \text{randInt}(0, 59)$$

$$f = 55 \cdot 2^{\frac{n}{12}}$$

As you can see on the chart, the frequency of the note A in the first octave is 55Hz. The range 0 to 59 is used for the 60 notes in the chart. Notice the use of **n** in  $2^{(n/12)}$  to generate the **n**th note from A1. When **n** is zero, then the frequency is 55Hz, since  $2^0$  is 1.

Notes	Frequency (octaves)				
A	55.00	110.00	220.00	440.00	880.00
A#	58.27	116.54	233.08	466.16	932.32
B	61.74	123.48	246.96	493.92	987.84
C	65.41	130.82	261.64	523.28	1046.56
C#	69.30	138.60	277.20	554.40	1108.80
D	73.42	146.84	293.68	587.36	1174.72
D#	77.78	155.56	311.12	622.24	1244.48
E	82.41	164.82	329.64	659.28	1318.56
F	87.31	174.62	349.24	698.48	1396.96
F#	92.50	185.00	370.00	740.00	1480.00
G	98.00	196.00	392.00	784.00	1568.00
A $\flat$	103.83	207.66	415.32	830.64	1661.28