CALCULATOR SOFTWARE .CO .UK

Teacher Notes for Data Maker

Compatibility: TI-83/83+/83+SE/84+/84+SE

Run The Program Called: **DATAMAKE**

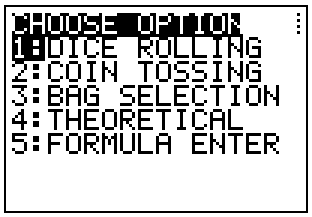
▶ Summary

This program has been written with the intention of making the in-built statistical, sequence and graphing facilities of the calculator easier to use.

It has been used in classrooms when introducing basic probability up to sampling from theoretical distributions.

Also it can be used for explicit sequence formulae - the formula is entered in terms of the variable "n" and selected terms of the sequence can then be displayed.

▶ Features



From the first menu, there is a choice of 5 options that can be simulated and generated. In addition, all of the data that is created can be viewed either in a table of results or in graphical form.

This data is also available for further analysis after quitting the program - it is held in lists L_1, L_2 and L_3.

Dice Rolling

You can choose how many dice you wish to have rolled, how many sides each die has and what is done with their scores - either **SUM**, **PRODUCT**, **MINIMUM**, **MAXIMUM** or **DIFFERENCE** (if only rolling 2 dice).

You select how many trials of the experiment you wish to have.

The resulting frequency table and graph can be traced and the data is held in L_1 (Raw Data), L_2 (Grouped Data), L_3 (Group Frequencies)

Coin Tossing

You choose how many coins to toss and how many times to toss them.

The resulting frequency table and graph indicates how many heads were obtained (Heads=1, Tails=0).

Once the program is quit, the data is held in L_1 (Raw Data), L_2 (Grouped Data), L_3 (Group Frequencies)

Bag Selection

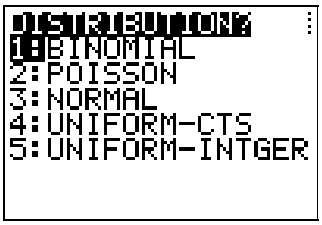
This option simulates selecting counters from a bag. You choose how many colours there are in the bag, how many of each colour there is, how many are withdrawn at each trial and whether they are replaced in the bag before the next counter is drawn.

You select how many repeat trials of the experiment you wish to have.

In addition to the frequency table and graph, you can also choose to view the relative frequency of a certain colour against the number of trials.

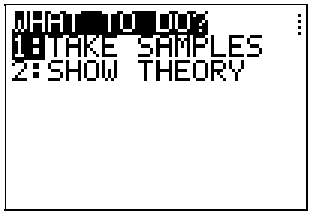
Depending on the display option selected, the data is held in L_1, L_2 and L_3

Theoretical



After selecting your chosen distribution, you will need to enter its appropriate parameters.

If you select **TAKE SAMPLES**, you then need to choose between viewing **SINGLE SAMPLES** or the **SAMPLE MEAN**. For the latter, the size of the sample needs to be entered.



Thereafter, the number of samples to be taken needs to be entered.

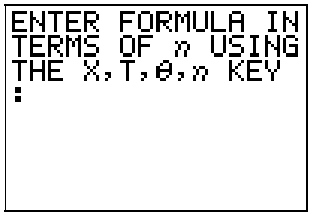
After the display of **SINGLE SAMPLES**, you are given the option to overlay on the graph the theoretically correct data - choose **FIT THEORY** to do this.

If you select **SHOW THEORY**, then the program will produce a probability density graph for your chosen distribution.

Note that for Continuous Distributions, the program approximates the distribution with 100 data points. This is due to limitations of the calculator for calculating inverse probabilities for certain distributions.

Again, data is held in L_1, L_2 and L_3 if needed.

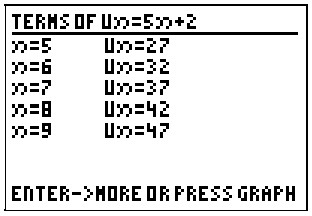
Formula Enter



This option allows you to enter in an explicit formula for a sequence in terms of "n".

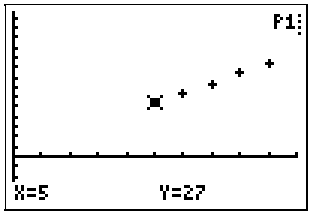
You then need to specify the first and last terms that you wish to calculate.

The generated table of results can also be viewed on a graph of sequence value against term number.



The illustrated screenshots show the sequence u_n=5n+2 being calculated and plotted for the 5th, 6th, 7th, 8th and 9th terms.

After quitting, L_1 holds the term number and L_2 holds the value of that term.



▶ Suggestions

The main benefit this program offers is the fast generation of simulation data. Hence it is best used when the teacher is seeking to convey concepts of distributions or experiments, without lots of dice or coins being juggled around in the classroom. This is not to say such "hands-on" practical lessons are to discredited - on the contrary. Such activities and this program each have their unique part to play in helping students understanding experiment outcomes, long term trends, relative frequency and expectation.

When delivering content involving theoretical distributions, the program proves invaluable in supporting students' appreciation of what theoretical distributions look like, especially when starting on Hypothesis testing with either 1 or 2-tail tests.

The Central Limit Theorem can be convincingly demonstrated by taking repeated sample means from a uniform distribution. The key point is that even a "flat" distribution gives rise to a Normal distribution shape of results. As students have to enter in all the required parameters to run such a simulation, it has been found to help their appreciation of what taking sample means actually involves doing!