# Mental Maths

Introduction

Letters and Numbers was a very popular television show on SBS. The game show consisted of two main games. The word game required participants to build the longest word from nine randomly generated letters. The letters consisted of a nominated combination of vowels and consonants. The number game consisted of a total of six numbers, some small and some large. The numbers must be put into an equation to form a result as close as possible to the three-digit target number.

In this activity you will write a program that will simulate the "numbers" component of this popular television show.

Creating a Program

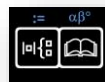Start a new TI-Nspire document and insert a New Program.

Call the program: Numbers
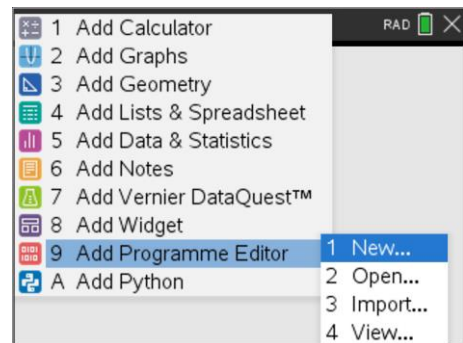
The large numbers in the game consist of: {25, 50, 75, 100}.

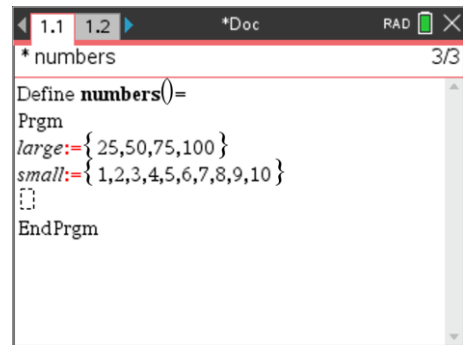Small numbers consisted of: {1, 2, 3, … 10}

These sets of numbers can be stored:

Large:={25,50,75,100}

Small:={1,2,3,4,5,6,7,8,9,10}

The ":=" symbol is located above the maths templates.

The next step for the program is to request the quantity of small numbers, a value between 3 and 5.
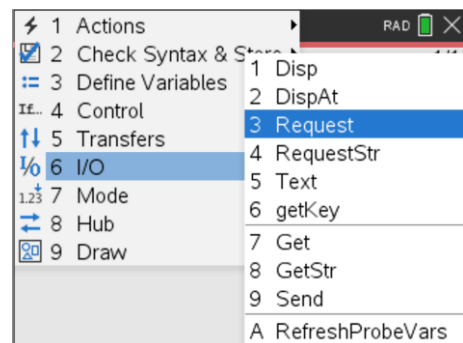
[menu] > **I/O** > **Request**

The request command consists of a combination of text and variable.

Request "text prompt", variable

For this request, a prompt such as "How many smalls" is sufficient. Store the result in 'n'. (variable)

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TEXAS INSTRUMENTS

The random sample command has the following syntax:

RandSamp(list,quantity,repeats)

The sample is taken from the small numbers, the quantity of numbers to be sampled is 'n'. If repeats = 1, digits will not be repeated, however if repeats = 0, then repeats may occur.

The RandSamp command can be accessed from the catalogue. The sample is stored in variable 'S'.

Repeat this instruction using the appropriate list, quantity of numbers and corresponding repetition for large numbers. Store the result in "L".

The program is now ready to display some values to the user.

The first item to be displayed is the target value. The target value lies between 100 and 999.

$\boxed{\text{menu}}$ > **I/O** > **Disp**

The random integer (whole number) is available from the catalogue.

Disp "Target Number ", RandInt(101,999)

Include similar display statements to show the selection of large (L) and small (S) numbers.

The final step is to include a timer! The "wait" command can be used as a timer.

$\boxed{\text{menu}}$ > **Control** > **Wait**

The television show provided just 30 seconds, in this game you have 60 seconds. Set the wait timer to 60.

Program execution halts while the wait command is active. Immediately after the wait command, insert another display command to instruct the user to "stop".

Once you have finished writing your program, press **Ctrl** + **R** and start playing.

Question: 1.

Test your program to make sure it works.

a) Write down the target number and list of numbers generated.

b) Write down your best attempt at a solution.

In this version of the game you get a score. 100 Points is obtained if you get the score exactly. For every unit you are away from the target value, you lose a point.

c) Write down your score.

Question: 2.

Repeat Question 1 four more times, including the calculation of your score, then calculate your average score.

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Question: 3.

For any game that you played with a score less than 100 points, determine if it was actually possible to get a perfect score, had more time been available.

Note: This may take some time!

Extension

Question: 4.

Are all target numbers achievable when 2 large and 4 small numbers are used?

Question: 5.

Edit your program to warn the user when there is only 10 seconds left on the timer.

Question: 6.

Edit your program to provide a countdown timer for duration of the game.

Hint: The "display at" (dispat) command repeatedly displays the output on the same line.

Example: Dispat 2,value (where value is the amount of time remaining)

Question: 7.

Edit your program so the user can enter the amount of time they want to determine a solution.

Question: 8.

Edit your program to ensure the user only selects between 3 and 5 small numbers.

Question: 9.

Edit your program to allow the user to select the quantity of numbers they have in order to solve the problem.