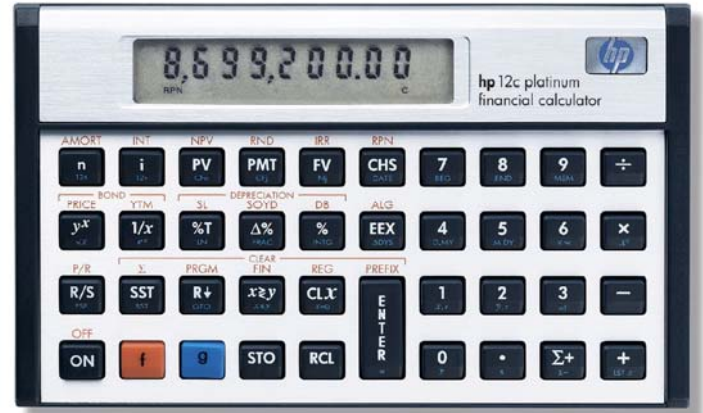# hp calculators

HP 12C Platinum
Using Memories to Solve Problems

Constant memory and planning

Using register contents

Understanding register arithmetic

Practice using registers to solve problems

Constant memory and planning

Because of the HP12C Platinum Constant Memory feature, any current computations may be stopped at any moment for later resumption without any data loss. In the HP12C Platinum, memory is organized as a set of **registers**, where each register can hold a number representation of any positive or negative value with a 10-digit mantissa and a two-digit integer, positive or negative exponent of ten. When writing programs, part of these registers may also be converted to seven program steps each.

Using register contents

Most of these registers can be directly addressed anytime it is necessary, provided that the register is available. Special care must be taken in regard to make sure that the chosen register isn't being used for other purposes. As a general rule, two basic operations can always be performed over existing register contents: storing and retrieving (or recalling) numbers.

Assuming that the display contains a value to be stored, and that the storage location (register name) is already defined, the keystroke sequence below may be performed to store the information: [STO] [key]. To retrieve the information stored in one of the registers back to the display and use it in further calculations, it is necessary to use the following keystroke sequence: [RCL] [key].

In both sequences, [key] refers to any valid keystroke sequence that defines the location (which register) where the information in the display will be stored in or retrieved from. The valid keys for these registers are:

[0] to [9]
[•][0] to [•][9]
[n] , [i] , [PV] , [PMT] and [FV]

Example 1: The index for conversion between American Dollars and Euros is stipulated as 1.00 Euro = US\$1.19. Which keystroke sequence stores this index in register R_1?

Solution: The complete sequence for typing the index in and storing its value in register R_1 is:
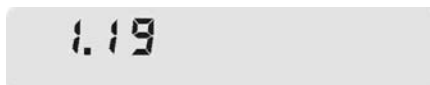
[1][•][1][9] [STO][1]

$$1.19$$

Figure 1

The image in Figure 1 shows the display contents after the keystroke sequence is executed.

Understanding register arithmetic

Along with storing and retrieval, the five lower-numbered registers (0 through 4) allow storage arithmetic with their contents and the display number.
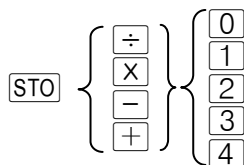
Figure 3 shows all valid keystrokes:

Figure 2

Example 2: The index for conversion between American Dollars and Euros has its valued raised by 1%. What is the keystroke sequence that updates the index in register R_1?

Solution: When the keystrokes below are used, the index is updated in R_1. The diagram shown in Figure 4 illustrates what happens with the register contents when [STO][X][1] is performed.

[1][·][0][1] [STO][X][1]

Display contents: typed in value

[STO][X][1]

Display contents remain unchanged

Value already stored in R_1

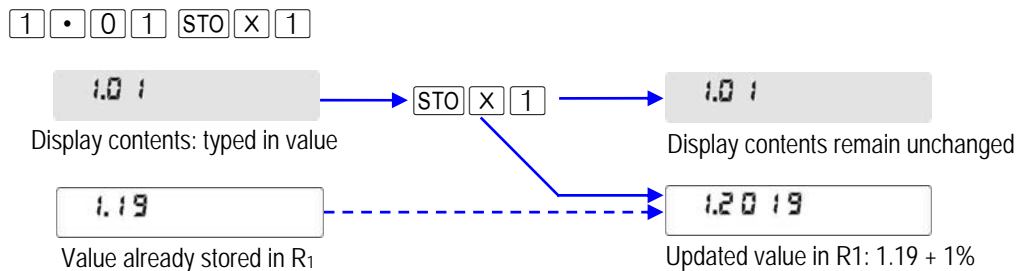Updated value in R1: 1.19 + 1%

Figure 3

If it is necessary to check the resulting value stored in R_1 or use it in further calculations, the following keystroke sequence must be used to bring its contents to the display:

[RCL][1]

Figure 4

To check the significant digits (mantissa) of the value already in the display, the following keystroke sequence can be used:

[f][PREFIX]

Figure 5

Answer: Now the relationship is set to 1.00 Euro = US$1.20.

Some remarks about register arithmetic:

1. When one of the registers is going to be used as an accumulator for summations with the use of sequences like [STO][+] ([0] to [4]), either the first value must be stored with [STO] ([0] to [4]) alone or a zero must be stored first.

2. When one of the registers is going to be used as an accumulator for products with the use of sequences like [STO][X] ([0] to [4]), either the first value must be stored with [STO] ([0] to [4]) alone or a one must be stored first.

3. The sequence [STO][÷] ([0] to [4]) when the display contains a zero causes the message **Error 0** to be displayed (division by zero) and no operation is performed.

Practice using registers to solve problems

Example 3: The sales price of the last 10 homes sold in the Parkdale community were: $198,000; $185,000; $205,200; $225,300; $206,700; $201,850; $200,000; $189,000; $192,100; $200,400. What is the average of these sales prices?

Solution: Register R_0 will be used to perform all operations. Then the resulting value will be brought back to the display. The average is computed using the following expression,

$$\bar{x} = \frac{\sum d_n}{n}$$

Figure 6

In this example, n is 10 (ten) and d_n is each sales price. So, all values are accumulated in R_0 and then the average is obtained by dividing the total accumulated by the number of entries. Be sure to initialize the contents of R_0 before starting the problem:

[0] [STO][0]

```
0.00
```

Figure 7

Now, each sales price is typed in and added to the existing amount in R_0:

[1][9][8][0][0][0] [STO][+][0]

```
198,000.00
```

Figure 8

The second sales price is entered by pressing:

[1][8][5][0][0][0] [STO][+][0]

$$185,000.00$$

Figure 9

Be sure to key in all sales prices and press [STO][+][0]. When the last sales price is keyed in and accumulated, its value remains in the display:

[2][0][5][2][0][0][STO][+][0] [2][2][5][3][0][0][STO][+][0]
[2][0][6][7][0][0][STO][+][0] [2][0][1][8][5][0][STO][+][0]
[2][0][0][0][0][0][STO][+][0] [1][8][9][0][0][0][STO][+][0]
[1][9][2][1][0][0][STO][+][0] [2][0][0][4][0][0][STO][+][0]

$$200,400.00$$

Figure 10

Now, divide R_0 (the accumulated sales) by ten.

[1][0] [STO][÷][0]

$$10.00$$

Figure 11

At this point, R_0 contains the resulting value: the average sales price for homes sold in Parkdale community. To display this average, press:

[RCL][0]

$$200,355.00$$

Figure 12

Answer: The average sales price for homes sold in Parkdale community is $ 200,355.00.