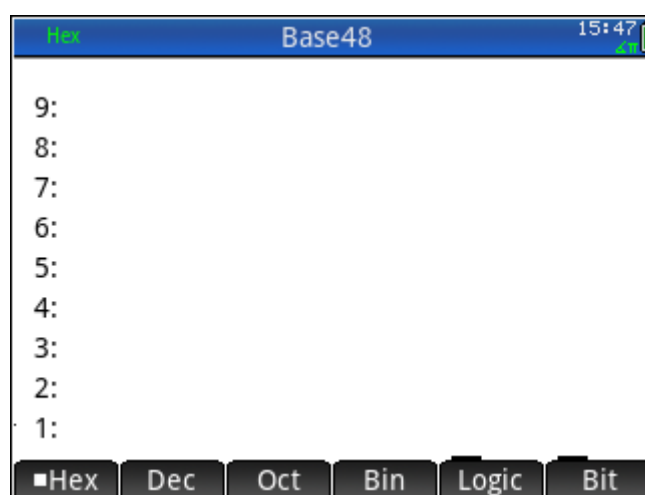


# Base48

Base48 is a small app for the HP Prime implementing Base functions in a RPL mode inspired by the HP-48GX within an environment with a stack, softkeys and similar function set.

## Overview



When you launch the Base48 App you get the screen above :

- **Hex** : This is the mode indicator, it is set when you press one of the Base soft keys : Hex, Dec, Oct or Bin
- **1:** to **9:** : these are the stack levels within the application, similar to the HP-48 RPL stack levels
- **Soft keys** : these soft keys are similar to the HP-48 soft keys, but as the Prime has a touch screen you just have to press on them and not on any physical key below the display.

**The soft key main menu** includes two parts :

1. The first part with the four **Base soft keys** to select the current base, plus two sub-menu keys : **Logic** for logic functions and **Bit** for bit-level functions :



2. The second part with a third sub-menu key : **Byte** for byte-level functions and two keys to recall and store the current word size (**RCWS** and **STWS**)



You switch between these two menus with the right and left cursor keys.

**Logic sub-menu:**

- This sub menu includes the same logic function as found on the HP-48GX
- To go back to the main menu, press **Base**












**Bit sub-menu:**

- This sub menu includes the same bit-level function as found on the HP-48GX
- To go back to the main menu, press **Base**

**Byte sub-menu:**

- This sub menu includes the same byte-level function as found on the HP-48GX
- To go back to the main menu, press **Base**


**Specific App active keys:**



- To exit the Base48 App, press the  or  key.  
*Note: to turn off the HP Prime, you need first to exit the Base48 app.*
- Once Base48 is the active application as indicated by Base48 in the top line of the display, you can call it again by just pressing the  key.
-   will give you some details about the application.
-   will give you access to the Base48 settings (details in the corresponding section below).
-  will give you access to some action configurable via the settings.
-   will clear the stack.
-  will swap the level 1 and level 2 of the stack.

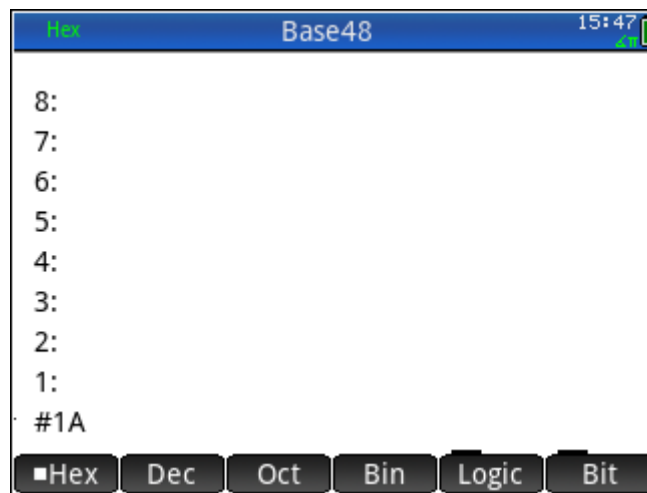
## Number entry


To enter a number in a given base, first make sure that the correct base has been selected: check the Base indicator on the top left of the screen or the dot before the Base soft key on the main menu.

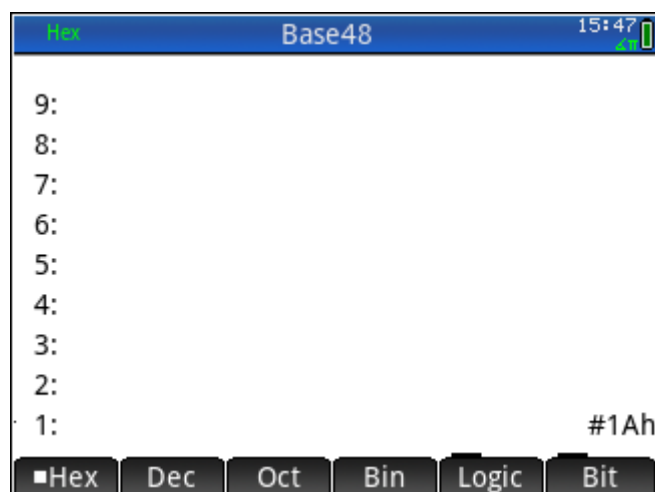
Then just press the digit keys for your number. The # prefix will be added automatically on the command line.

Only the digit keys valid for the current base are active: 0 & 1 for **Bin**, 0 to 7 for **Oct**, 0 to 9 for **Dec**, 0 to 9 and A to F for **Hex**. Note that in **Hex** mode you don't need to press  to enter the digits A-F, just press the corresponding keys.

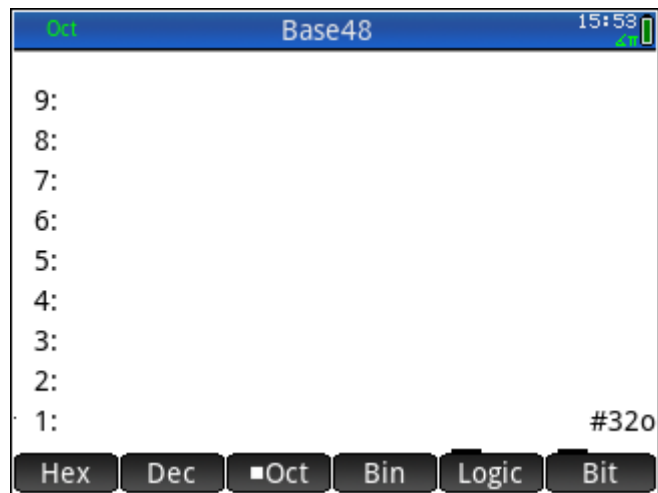
For example to enter #1A in hexadecimal, press the **Hex** soft key if the base indicator is not already Hex, then press the  and the  keys:



Then press , the number will move to the stack level one and the base suffix (h) will be automatically added:



Now press **Oct** to change the base to Octal, the numbers on the stack are automatically displayed in the new Base format:




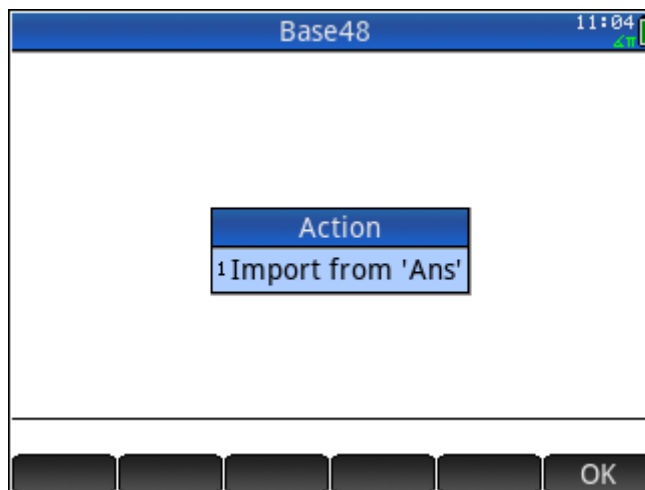
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*Note: this change is only applied to the display, internally the #1Ah number we entered previously is still stored as a hexadecimal number.*

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## Importing values in Base48

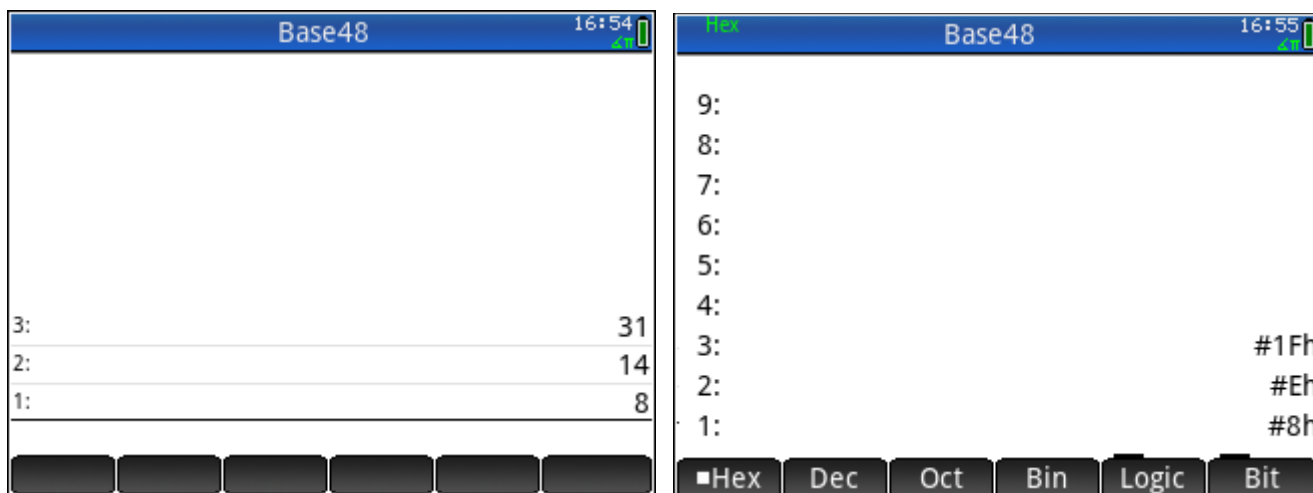
It is possible to import values into Base48 with the function “Import from ‘Ans’” accessed by default with the  key. (See the “Settings” section below for more details about the “Import from Ans” key mapping.)



What you import depends on the context when Base48 was called:

- Called from Home in Textbook or Algebraic: the value from Home Ans is imported into Base48 stack level 1. Only real or integer numbers are imported, real numbers are converted to the selected Base.
- Called from Home in RPN mode: the values from the RPN stack are imported into Base48 stack starting with stack level 1. Importation stops if all values have been imported, or at the first non real or non integer value. Real numbers are converted to the selected Base.
- Called from CAS : the value from the CAS Ans is imported into Base48 stack level 1. Only real numbers are imported and converted to the selected Base.

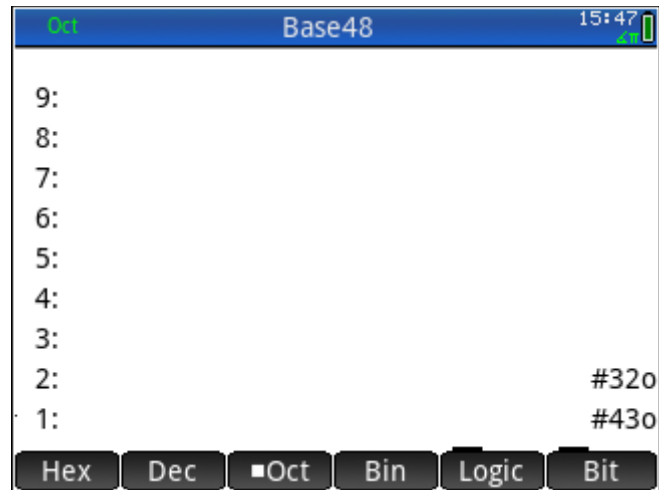
For example, if you have 31, 14 and 8 in the RPN stack, going into Base48 with the Hex base selected, when you import from Ans you get: #1Fh, #Eh, #8h in the stack:



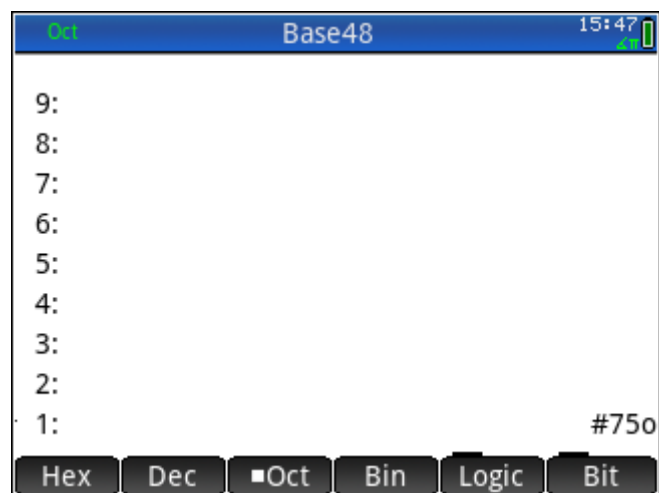
## Operators

The four arithmetic operators  $\boxed{+}$ ,  $\boxed{-}$ ,  $\boxed{\times}$ ,  $\boxed{\div}$ , are supported within the Base48 application.

To continue on the number entry example, enter now 43 in octal:

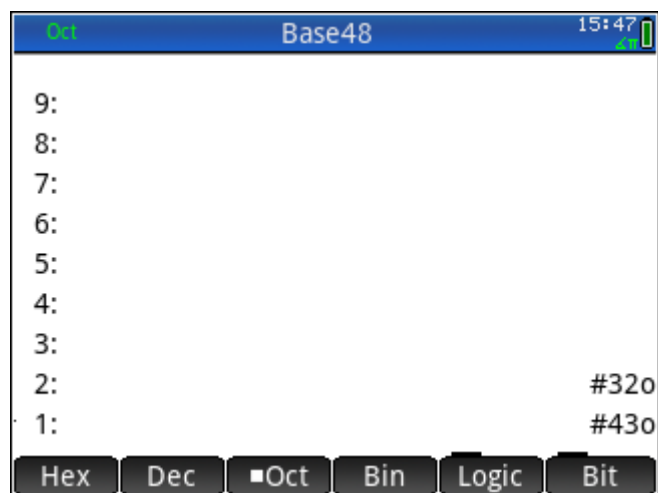


and press the  $\boxed{+}$  key to get the result of the addition of 32 and 43 in octal:



## Undo

The Base48 application allows to undo the last operation. By default it is done in the same way as the Undo in the Prime RPN mode: just press Shift Ans to undo the addition:





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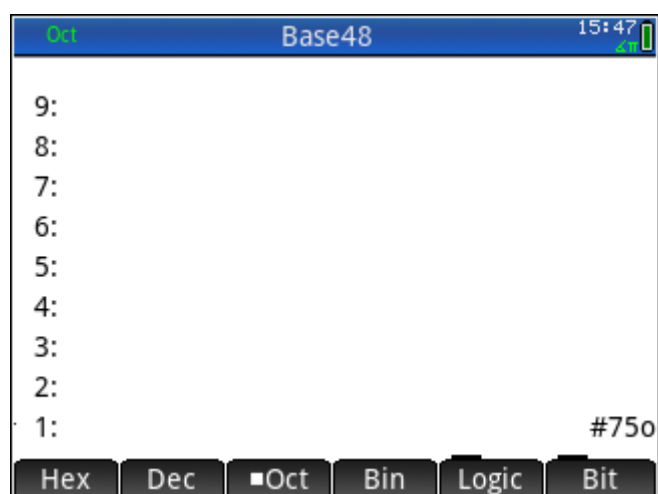
*Note: See the 'Settings' section below for more details about Undo.*

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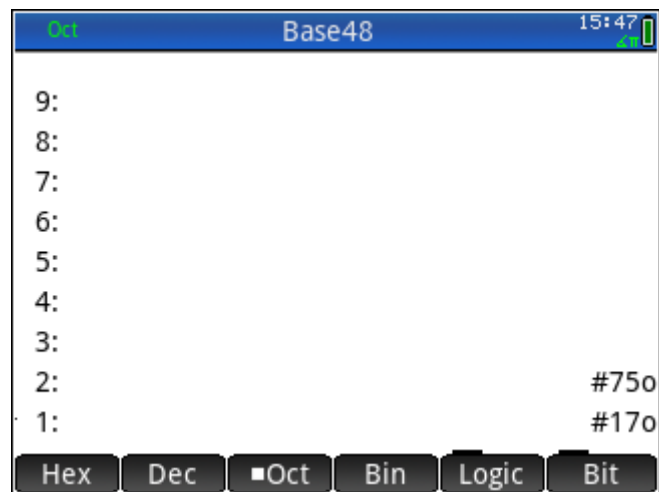
## Logic, Bit and Byte functions

To apply a Logic, Bit or Byte to the number(s) on the stack, first press the corresponding softkey to open the related sub-menu and then press the function softkey.

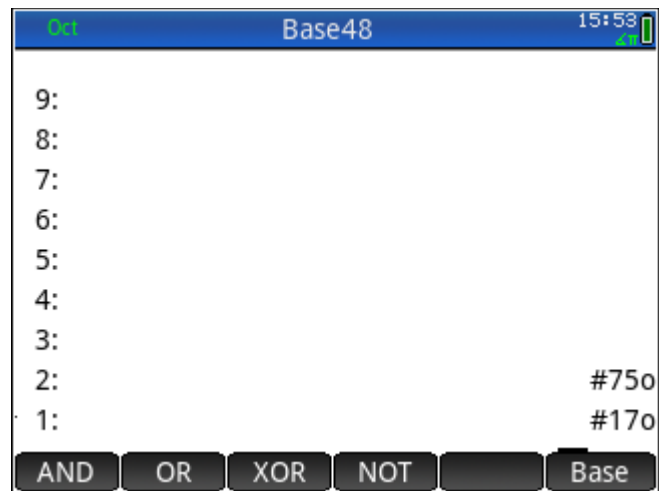
For example enter 75 in Octal (or just press  if you did the Undo above):



Then press enter 17 in Octal:



Press 'Logic':



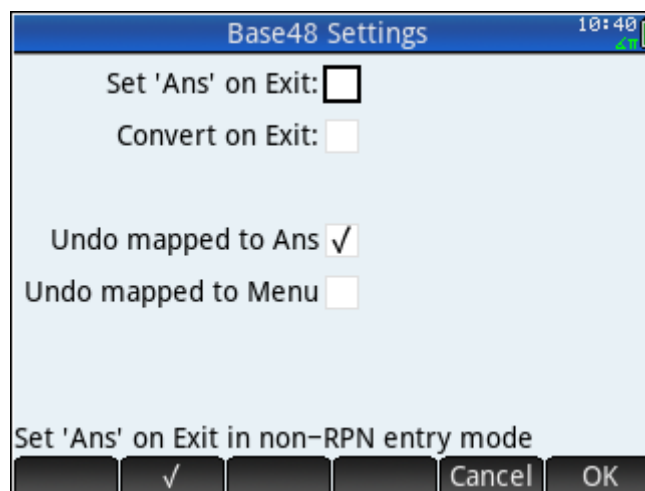
and press 'AND':





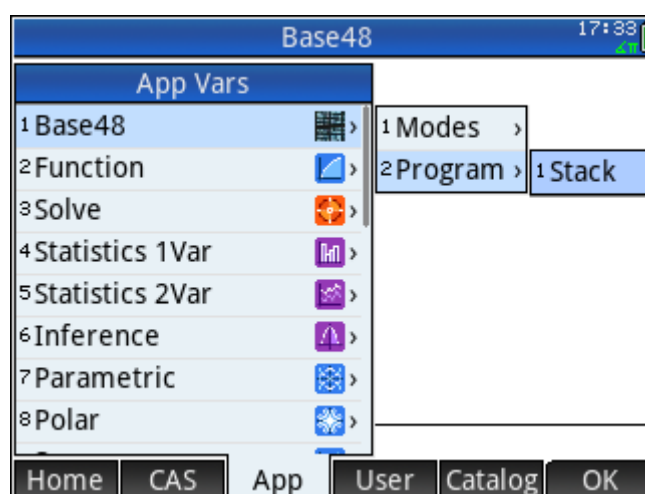
## Settings

The Base48 App settings are accessible with **Shift** **Num** **Setup** :



## Exit settings

The first two settings control how data are exported when you exit Base48. By default nothing is done, the Base48 stack content is only accessible in Home as a list through the app variable “Stack”:



It is however possible to improve this and return automatically to Home the stack level 1 (the latest result from the operations done in Base48) through Ans:

- Checking “Set ‘Ans’ on Exit” will ensure that when you exit the Base48 app the stack level 1 value is stored in Ans, so when you’re back in Home you can retrieve it by pressing



Note1: this works only in Home and in non-RPN entry mode (either Textbook or Algebraic), this doesn’t work in CAS as CAS uses a different ‘Ans’ than Home.

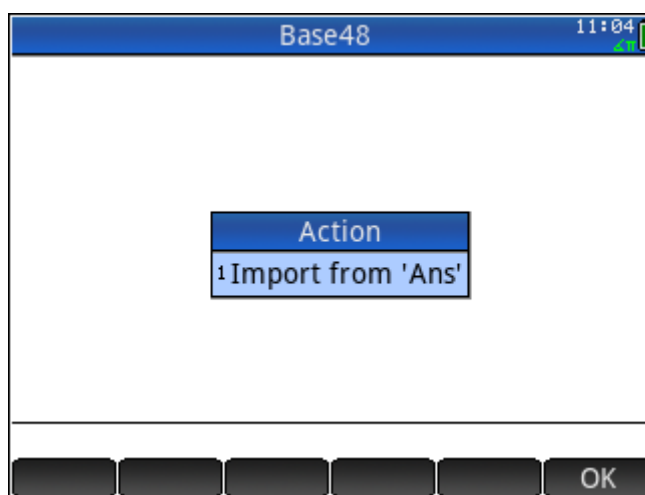
Note2: to retrieve Base48 stack values in RPN mode see the next section below.

- Checking “Convert on Exit” will convert the stack level 1 value stored in ‘Ans’ to the selected base. By default the value stored in ‘Ans’ is the internal value which is in the base it was entered and can be different from the current base in which it is displayed. For example: if you enter #1Fh in Hex and select Dec you have #31d on the display. By default #1Fh will be stored in ‘Ans’ on exit. If you select “Convert on Exit” then #31d will be stored in ‘Ans’.

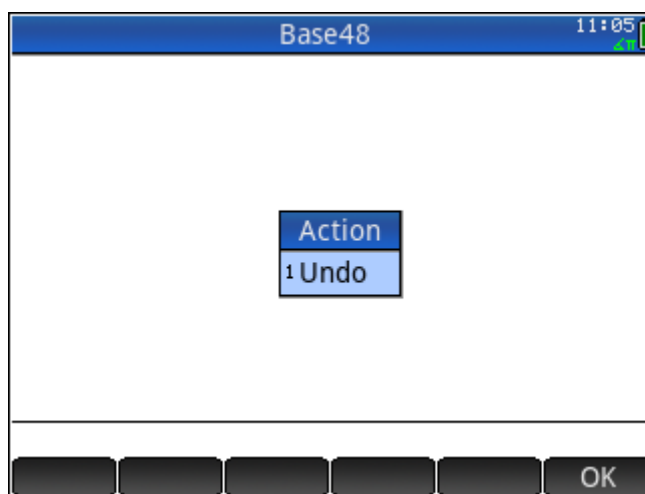
## Key mapping settings

The two next settings control the key mapping for ‘Undo’ and consequently for ‘Import from Ans’.

By default ‘Undo’ in Base48 is mapped to the **Shift** **Ans** key as this is similar to the HP Prime RPN mode ‘Undo’ feature. In this configuration the ‘Import from Ans’ function is mapped to an item from the ‘Menu’ key.



It is possible to change this mapping and instead use **Shift** **Ans** in Base48 for the ‘Import from Ans’ function by mapping the ‘Undo’ function to the ‘Menu’ key which swaps the two functions.



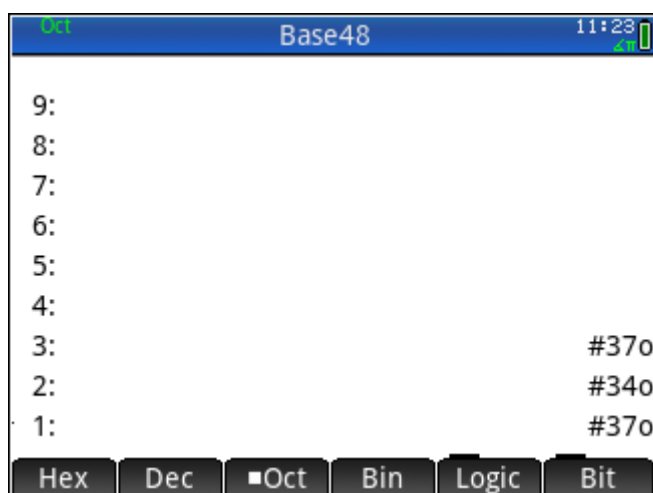
## Retrieving Base48 stack in RPN mode

It is possible to retrieve the complete Base48 stack content in RPN mode in a more friendly format that through the Stack variable list.

This requires assigning a specific User program to a User key, for example for the **Shift** **+** **Ans** key:


```
KEY KS_Plus()
BEGIN
  IF Entry==2 THEN
    RETURN ΣLIST(REVERSE(EXECON("STRING(&1)", Stack)));
  ELSE
    RETURN Ans;
  END;
END;
```

Once done, to see how this works, set-up the Home Entry mode to RPN, launch Base48, ensure that in Settings “Convert on Exit” is deselected, and enter #1Fh in Hex, then #28d in Dec and #37o in Oct, you should end up with this display where all values are shown in Octal:






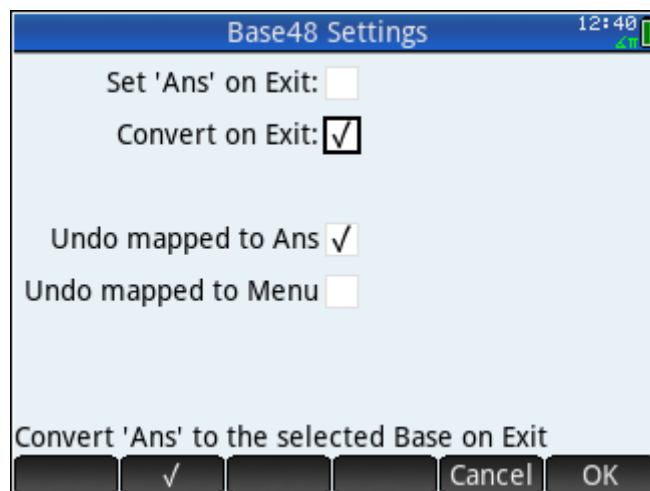
now press **Esc** **Clear** to exit Base48 and to go back to RPN mode. Then press **Shift** **Help** **User** **Shift** **+** **Ans** , you get all Base48 stack values (as they where entered) on the entry line:








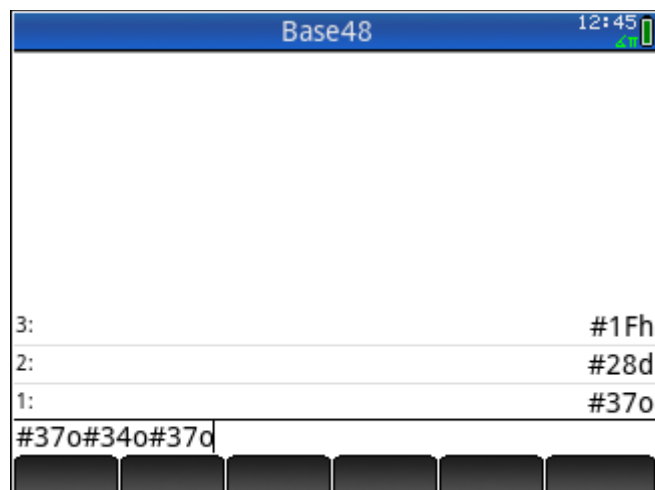
Press  to push them to the RPN stack:



Now press the  key to go back to Base48, press   and select “Convert on Exit”:



Press OK, press , you're back to the RPN Home screen, press     and you get all Base48 stack values in Octal on the entry line:



Press  and you have now on the RPN stack the three values in the different bases as they were entered (#1Fh, #28d, #37o), and also converted in Octal (#37o, #34o, #37o):

Base48		12:46
6:	#1Fh	
5:	#28d	
4:	#37o	
3:	#37o	
2:	#34o	
1:	#37o	