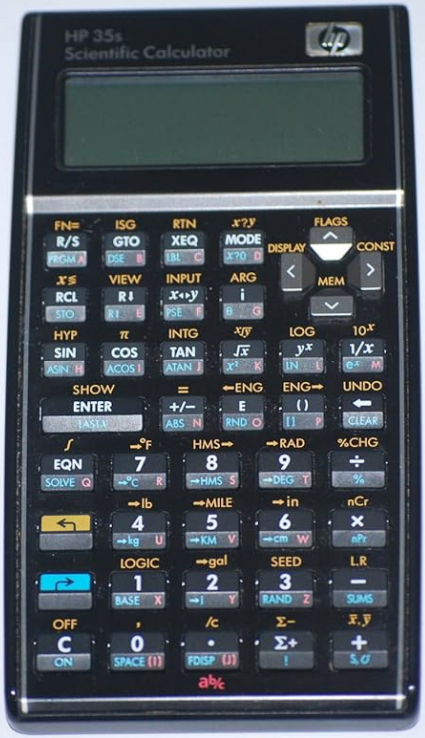
Calculated Encryption

Cipher Programs for the HP35s



John Livingstone

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Smashwords Edition

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Preface

These programs take advantage of Hewlett-Packard's equation mode combined with the flag 10, which displays equations instead instead of evaluating them.

This is used along in combination with math formulae to display text, one letter at a time. The sender may then write down the result of encryption or decryption by using the calculator, where messages are entered as A = 1, B = 2 up to Z = 26.

All programs were written in the RPN mode.

ROT13/ROT5

This program encrypts/decrypts using ROT13 for letters, ROT5 for numbers.
This program also requires 'Q', see below.

(RPN Mode)
C001 LBL C
C002 SF 10
C003 ROT13-ROT5 (On calculator press <EQN> then RCL R, RCL 0, etc, ENTER)
C004 PSE
C005 CF 10
C006 INPUT P input letter; A=1, B =2, etc
C007 X<0? 'IF P is negative then goto number encryption/decryption
C008 GOTO C012
C009 RMDR((P-1) + 13,26)+1-> C
C010 XEQ Q001 'see program Q below
C011 GTO C006
C012 INPUT N
C013 X<0? 'IF N is negative then return to letter encryption/decryption

C014 GTO C006
C015 RMDR(N+5,10)->C
C016 VIEW C
C017 GTO C012
Checksum length: 4f36,96

Usage:
P? 9 (9 = the letter I)
V
P? 14 (the letter N)
A
P? 5 E
R
P? 5 E
R
P? 4 D
Q
-4 (Enter a negative number to encipher a number)
N? 1
C = 6
N? 0

C = 5
N? 0
5
N? 0
5
N? -5
P? 21 (U)
H
P? 19 (S)
F
P? 4 (D)
Q
Thus, the message **I NEED 1000 USD** becomes:
V ARRQ 6555 HFQ
.

Beaufort Cipher

This program encrypts/decrypts using the Beaufort cipher. In addition, it can also add ROT 13 for added security.

This program also requires 'Q', see below.

(RPNMode)

B001 LBL B
B002 SF 10
B003 BEAFORT
B004 PSE
B005 1) ROT 13 'use ROT 13 w/beaufort? enter 1 for yes (enter <EQN> then 1) ECL R etc)
B006 PSE
B007 CF 10
B008 INPUT R
B009 INPUT P
B010 INPUT K
B011 RMDR(((K-1)-(P-1)),26)+1-> C
B012 RCL R
B013 1
B014 X = Y?

B015 RMDR((C-1)+13,26) + 1 -> C
B016 XEQ Q001
B017 GTO B009
Checksum, length F26B, 114

Usage:
XEQ B
R? (Choose whether to add ROT 13...enter 1 for yes)
P? (Enter letter of text where 1 = A 2 = B, etc)
K? (Enter a key letter (1-26)
Repeat until end of message.

Vigenere/Variant Beaufort Ciphers

This program will encrypt/decrypt using the Vigenere or Variant Beaufort. In addition use of a random or keyed alphabet is possible to provide greater security.
In variant Beaufort, encryption is performed by performing the decryption step of the standard Vigenère cipher, and likewise decryption is performed by using Vigenère encryption.
This program also requires the programs A, Q, and S. (See below.)

```
V001 LBL V
V002 SF 10
V003 1)VIGENERE 'enter <EQN> then 1) RCL V
etc
V004 PSE
V005 2)VAR BEAUFORT
V006 PSE
V007 CF 10
V008 INPUT M
V009 2
```

V010 X=Y?
V011 GTO V052
V012 SF 10
V013 VIGENERE
V014 PSE
V015 1)ENCRYPT
V016 PSE
V017 2)DECRYPT
V018 PSE
V019 CF 10
V020 INPUT M
V021 2
V022 X=Y?
V023 GTO V038
V024 SF 10
V025 (1Key Alphabet
V026 PSE
V027 CF 10
V028 INPUT A
V029 INPUT P
V030 INPUT K

V031 RMDR(((P-1)+(K-1)),26)+1 ->C
V032 RCL A
V033 1
V034 x=y?
V035 XEQ S001
V036 XEQ Q001
V037 GTO V029
V038 SF 10
V039 1(Key Alphabet
V040 PSE
V041 CF 10
V042 INPUT A
V043 INPUT C
V044 INPUT K
V045 RCL A
V046 1
V047 x=y?
V048 XEQ S005
V049 RMDR(((C-1)-(K-1)),26) -> C
V050 XEQ Q001
V051 GTO V043

V052 SF 10
V053 VAR BEAUFORT
V054 PSE
V055 1)ENCRYPT
V056 PSE
V057 2)DECRYPT
V058 PSE
V059 CF 10
V060 INPUT M
V061 2
V062 x=y?
V063 GTO V078
V064 SF 10
V065 1)KEY ALPHABET
V066 PSE
V067 CF 10
V068 INPUT A
V069 INPUT P
V070 INPUT K
V071 RMDR(((P-1)-(K-1)).26)+1 -> C
V072 RCL A

V073 1
V074 x=y?
V075 XEQ S001
V076 XEQ Q001
V077 GTO V069
V078 SF 10
V079 1)KEY ALPHABET
V080 PSE
V081 CF 10
V082 INPUT A
V083 INPUT C
V084 INPUT K
V085 RCL A
V086 1
V087 x=y?
V087 GTO S005
V089 RMDR(((C-1)+(K-1)),26) +1-> C
V090 XEQ Q001
V091 GTO V083
Checksum, length:6D5F, 520

LBL Q

Returns text where a = 1...z = 26

RPN Mode
Q001 LBL Q
Q002 SF 10'(set flag 10)
Q003 1
Q004 RCL C
Q005 X = Y? 'C=1? Then text = A
Q006 A (On calculator press <EQN> then RCL A, ENTER)
Q007 2
Q008 RCL C
Q009 X=Y?
Q010 B
Q011 3
Q012 RCL C
Q013 X=Y?
Q014 C
Q015 4
Q016 RCL C

Q017 X=Y?
Q018 D
Q019 5
Q020 RCL C
Q021 X=Y?
Q022 E
Q023 6
Q024 RCL C
Q025 X=Y?
Q026 F
Q027 7
Q028 RCL C
Q029 X=Y?
Q030 G
Q031 8
Q032 RCL C
Q033 X=Y?
Q034 H
Q035 9
Q036 RCL C
Q037 X=Y?

Q038 I
Q039 10
Q040 RCL C
Q041 X=Y?
Q042 J
Q043 11
Q044 RCL C
Q045 X=Y?
Q046 K
Q047 12
Q048 RCL C
Q049 X=Y?
Q050 L
Q051 13
Q052 RCL C
Q053 X=Y?
Q054 M
Q055 14
Q056 RCL C
Q057 X=Y?
Q058 N

Q059 15
Q060 RCL C
Q061 X=Y?
Q062 0
Q063 16
Q064 RCL C
Q065 X=Y?
Q066 P
Q067 17
Q068 RCL C
Q069 X=Y?
Q070 Q
Q071 18
Q072 RCL C
Q073 X=Y?
Q074 R
Q075 19
Q076 RCL C
Q077 X=Y?
Q078 S
Q079 20

Q080 RCL C
Q081 X=Y?
Q082 T
Q083 21
Q084 RCL C
Q085 X=Y?
Q086 U
Q087 22
Q088 RCL C
Q089 X=Y?
Q090 V
Q091 23
Q092 RCL C
Q093 X=Y?
Q094 W
Q095 24
Q096 RCL C
Q097 X=Y?
Q098 X
Q099 25
Q100 RCL C

Q101 X=Y?
Q102 Y
Q103 26
Q104 RCL C
Q105 X= Y?
Q106 Z
Q107 CF 10 Clear flag 10
RTN

Checksum, length: DI84, 393

Random/Keyed alphabet

This program lets user input a random or keyed alphabet.

A keyed alphabet scrambles the alphabet using a key word, such as NUMBERS:

N U M B E R S A B C D F G H I J K L O P Q T V W X Y Z

Note: (I) refers to an Indirect Address variable, which *must* be entered by pressing RCL (I), not 'I' in parenthesis

```
A001 LBL A
A002 26 -> (I)
A003 1.026 -> I
A004 INPUT A
A005 STO (I)
A006 ISG I
A007 GTO A004
A008 1.026 -> I
A009 IP(I) -> A
A010 VIEW A
```

A011 (I)-> C
A012 XEQ Q001
A013 ISG I
A014 GTO A009
A015 RTN
Checksum, length:F7B7, 77
.

Random/Keyed Alphabet Program

Uses the alphabet entered in the previous program.

```
S001 LBL S
S002 C -> I
S003 (I) -> C
S004 RTN
S005 1.026 -> I
S006 RCL (I)
S007 RCL C
S008 x=y?
S009 GTO S012
S010 ISG I
S011 GTO S006
S012 IP(D)-> C
S013 RTN
Checksum, length:3643, 61s
```

About the Author

John Livingstone is a photographer/musician living in Franca, São Paulo, Brazil, with his wife Solange.

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