

shadow block 251

square root shadow

```
root hl-nr no carry involved,  
hl 32-bit integer 0..ffff.ffff  
n 16-bit root 0..ffff  
r residual 0..1fffe
```

e4root lh-nr interface to e4th stack node

root has been exhaustively tested using eforth to check that the residual for perfect squares is zero & that $n*n+r$ equals hl is always true.

shadow block 253

block 250

32-bit square root and multiply

```
0 org start is run from ide  
start2 000 down b! .. ahead
```

```
2*d 003 hl-hl' -if push - 2* - pop 2* ;  
then push 2* pop 2* ;
```

```
root 008 hl-nr  
2*d 2*d push push 0 pop 10000  
loop if  
nhs.l a! over 2* over - . + a . +  
nht.l -if - push drop a or pop dup then  
nhx.l drop pop 2*d push a 2/ loop ;  
then nhs.l drop pop drop 2/ 1FFFF and ;
```

```
mult 01C uu-hl  
a! 0 17 for +* 1FFFF and next a ;
```

then 252 load 035 exit

block 252

square root and unsigned multiply for eforth

```
try 024 ixx-yy @p+ !b .. ' !p+ pops '  
@b if  
e4root 027 lh-nr  
@p+ !b @b .. ' !p+ . . !p+ ' @b root  
@p+ !b push .. ' @p+ @p+ ; ' !b pop !b  
drop try ;
```

```
then  
e4mult 02E uu-lh  
@p+ !b @b .. ' !p+ . . !p+ ' @b mult  
@p+ !b !b .. ' @p+ . @p+ ; ' !b  
drop try ;
```

035