

DASK

SONDAG EFTIRMIDDAG
29. SEPTEMBER 1957

$$n^2 = (n-1)^2 + 2n - 1$$

BENT SCHARØE

29. september 1957, en søndag eftermiddag, fik jeg det første testprogram fejlfrit igennem Dask. Det var den såkaldte n^2 -test hvor man beregner n^2 på to måder, dels ved direkte multiplikation, dels ved addition ud fra det foregående kvadrattal efter formlen $n^2 = (n-1)^2 + 2n - 1$, hvorefter de to resultater sammenlignes.

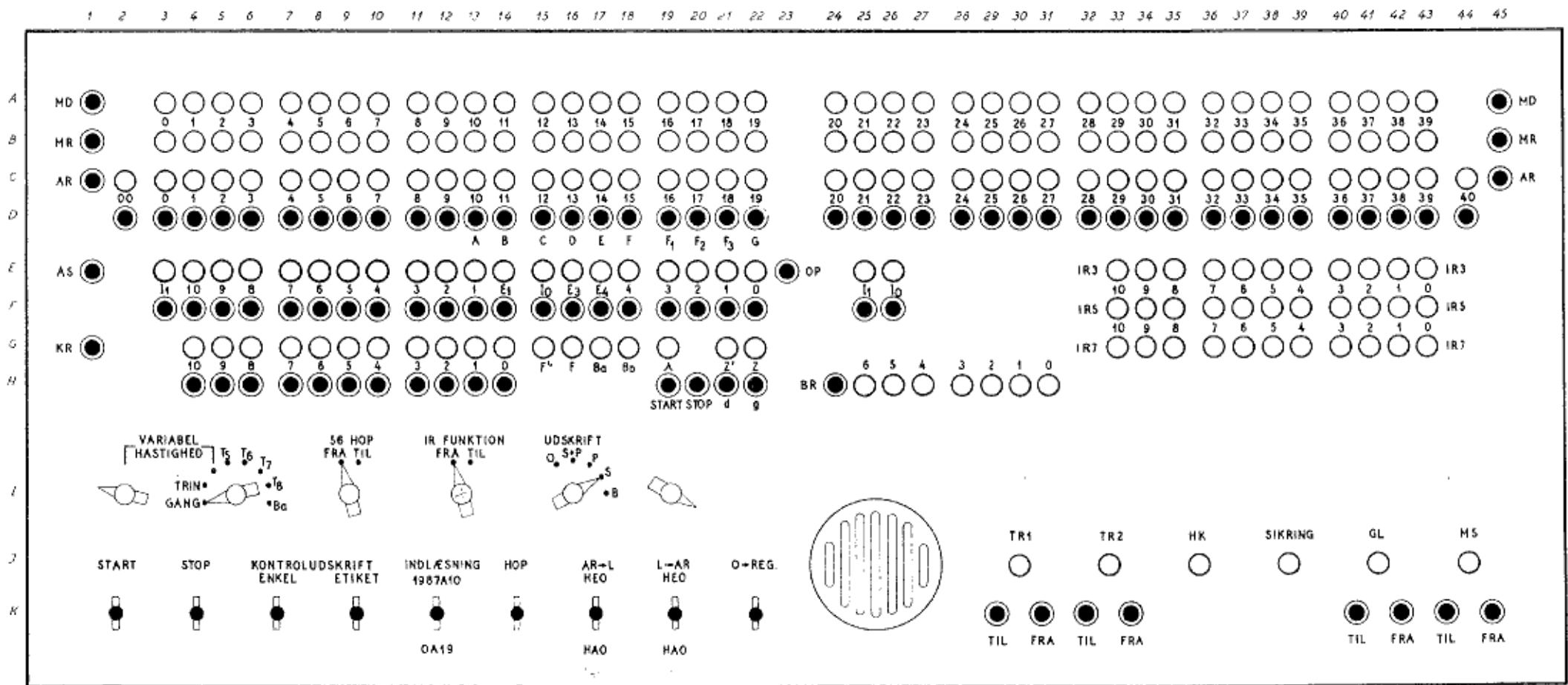
FELDFRI KORT
 —————
 DET FØRSTE TESTPROGRAM

```
0000-00219--01219-01210--01419-01619--01819-01a19--01c19-01e19--CR
02019-0221900019--00219-00419--00619-00819--00a19-00c19--00e19-01019--CR
00430----00000-00000--00000--00000--CR
01140-00004--00008-0004a--00040-0010c--011-01--00206--00007-00201--CR
00411-00032--0000000001-----CR
```

$$n^2 = (n-1)^2 + 2n - 1$$

DASK n²

DASK KONTROLBORD



REGNECENTRALEN Dansk Institut for Matematikmaskiner	Tegnet	TV 11.4.59	DASK KONTROLBORD	DASK
	Kontrol			KBm - 5
	Godk			

8110-2024

n^2 TEST, ALGOL-AGTIGT

```
n := n2 := 0;
NEXT n:
  n := n + 1;
  n2 := n2 + n shift 1 - 1;
  if n*n - n2 >= 0 then
    goto NEXT n;
stop;
```

LÆREBOG I KODNING

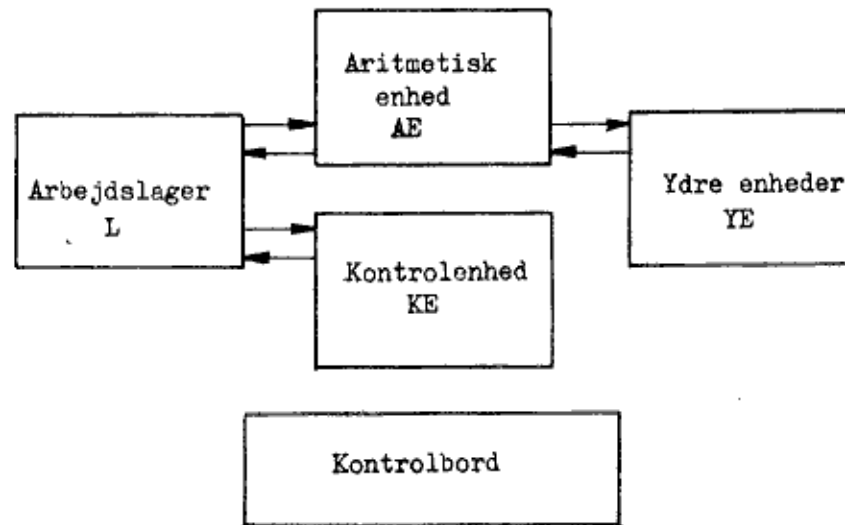
FOR

DASK

VED

CHR. ANDERSEN, NIELS IVAR BECH, OLE MØLLER

DASK DELE



DASK LAGER

Helceller			
Nr.	Venstrehalvceller	Højrehalvceller	Nr
0			1
2			3
4			5
6			7
:			:
:			:
:			:
:			:
:			:
:			:
2046			2047

n² TEST STRIMMEL

CR

00000-00219--01219-01210--01419-01619--01819-01a19--01c19-01e19--CR

02019-0221900019--00219-00419--00619-00819--00a19-00c19--00e19-01019--CR

00430----00000-00000--00000--00000--CR

01140-00004--00008-0004a--00040-0010c--011-01--00206--00007-00201--CR

00411-00032--0000000001-----CR

H. B. HANSEN

INDLÆSNING STRIMMEL. I begyndelsen af computerens historie, før ROM-lagrene blev opfundet, var det et problem at få det allerførste program ind i maskinen (operativsystemet er jo, når alt kommer til alt, også et program). ... Vippekontakten INDLÆSNING STRIMMEL bevirkede at der kom en ordre med adresse 0 i AS og kode 19 i OP. Når man herefter trykkede på START blev denne ordre udført, og der blev indlæst 10 sedecimale cifre til celle 0. Disse 10 sedecimale cifre kan fortolkes som to ordrer, da hver ordre fylder en halvcelle. Med én ordre kan man altså indlæse to.

0A19 (= 00019)

Læs 10 rækker fra strimmel.

Operationsbetegnelse: 19

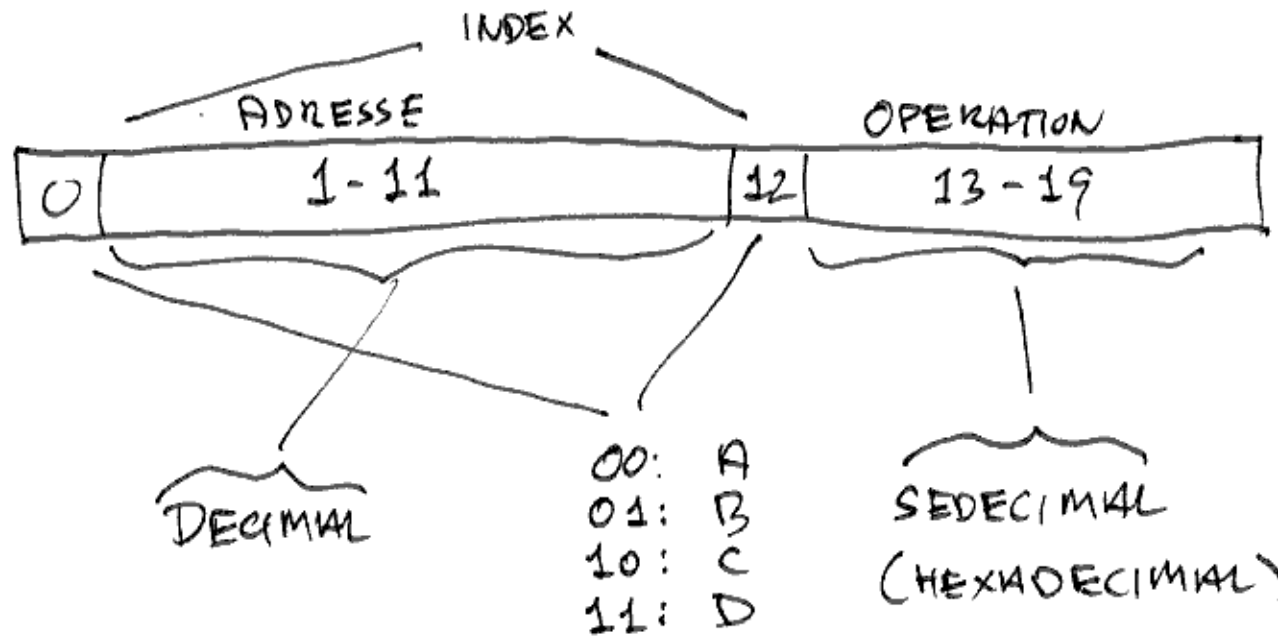
Kode: n, I, 19

Virkning: Først læses et helord (= 10 sedecimale cifre = 10 rækker på strimmelen) ind i AR. Er m lige læses helordet derefter til hec m. Er m ulige, læses C(ARh) til hhac m.

Indholdet ændres i: AR samt for
m lige: hec m
m ulige: hhac m

Tid: ca. 450 AT.

DASK ORDER (20 BITS)



ORDRE EKSEMPLER

5-HEX

- 00219
- 01219
- 01210

DASK ORDRE NOTATION

- 2A19
- 18A19
- 18A10

INDLESNING 1: 0A19 (=00019)+START

tape[0] = 0000000219
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001

{
celle[0] = 00000
celle[1] = 00219 <= KR

INDLÆSNING 2: CELLE[1] = 00219 (= 2A19)

```

tape[0] = 0000000219
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001

```

```

celle[0] = 00000
celle[1] = 00219
celle[2] = 01219 <= KR
celle[3] = 01210

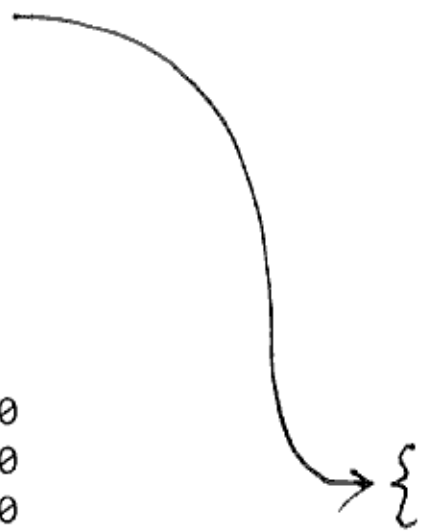
```

INDLÆSNING 3: CELLE[2] = 01219 (= 18A19)

```

tape[0] = 0000000219
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001

```



```

celle[0] = 00000
celle[1] = 00219
celle[2] = 01219
celle[3] = 01210 <= KR
...
celle[18] = 01419
celle[19] = 01619

```


INDLÆSNING 4: CELLE[3] = 01210 (= 18A10) TOP!

```

tape[0] = 0000000219
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001

```

```

celle[0] = 00000
celle[1] = 00219
celle[2] = 01219
celle[3] = 01210
...
celle[18] = 01419 <= KR
celle[19] = 01619

```

NB!


INDLÆSNING 5: CELLE[18] = 01419 (= 20A19)

```
tape[0] = 0000000219 |
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001
```

```
celle[0] = 00000
celle[1] = 00219
celle[2] = 01219
celle[3] = 01210
...
celle[18] = 01419
celle[19] = 01619 <= KR
celle[20] = 01819
celle[21] = 01A19
```

INDLÆSNING 6: EFTER INDLÆSNING TIL CELLE [34-35]

```

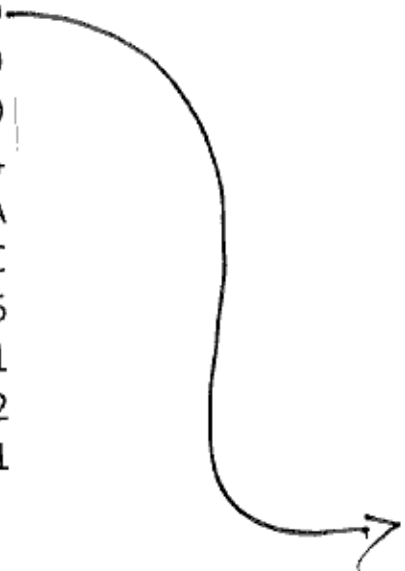
tape[0] = 0000000219
tape[1] = 0121901210
tape[2] = 0141901619
tape[3] = 0181901A19
tape[4] = 01C1901E19
tape[5] = 0201902219
tape[6] = 0001900219
tape[7] = 0041900619
tape[8] = 0081900A19
tape[9] = 00C1900E19
tape[10] = 0101900430
tape[11] = 0000000000
tape[12] = 0000000000
tape[13] = 0114000004
tape[14] = 000080004A
tape[15] = 000400010C
tape[16] = 0110100206
tape[17] = 0000700201
tape[18] = 0041100032
tape[19] = 0000000001

```

```

celle[0] = 00000
celle[1] = 00219
celle[2] = 01219
celle[3] = 01210
...
celle[18] = 01419
celle[19] = 01619
celle[20] = 01819
celle[21] = 01A19
celle[22] = 01C19
celle[23] = 01E19
celle[24] = 02019
celle[25] = 02219
celle[26] = 00019 <= KR
celle[27] = 00219
celle[28] = 00419
celle[29] = 00619
celle[30] = 00819
celle[31] = 00A19
celle[32] = 00C19
celle[33] = 00E19
celle[34] = 01019
celle[35] = 00430

```



INDLÆSNING 7: KLAR TIL KØRSEL

tape[0] = 0000000219	celle[0] = 00000	celle[18] = 01419
tape[1] = 0121901210	celle[1] = 00000	celle[19] = 01619
tape[2] = 0141901619	celle[2] = 00000	celle[20] = 01819
tape[3] = 0181901A19	celle[3] = 00000	celle[21] = 01A19
tape[4] = 01C1901E19	celle[4] = 01140	celle[22] = 01C19
tape[5] = 0201902219	celle[5] = 00004	celle[23] = 01E19
tape[6] = 0001900219	celle[6] = 00008	celle[24] = 02019
tape[7] = 0041900619	celle[7] = 0004A	celle[25] = 02219
tape[8] = 0081900A19	celle[8] = 00040	celle[26] = 00019
tape[9] = 00C1900E19	celle[9] = 0010C	celle[27] = 00219
tape[10] = 0101900430	celle[10] = 01101	celle[28] = 00419
tape[11] = 0000000000	celle[11] = 00206	celle[29] = 00619
tape[12] = 0000000000	celle[12] = 00007	celle[30] = 00819
tape[13] = 0114000004	celle[13] = 00201	celle[31] = 00A19
tape[14] = 000080004A	celle[14] = 00411	celle[32] = 00C19
tape[15] = 000400010C	celle[15] = 00032	celle[33] = 00E19
tape[16] = 0110100206	celle[16] = 00000	celle[34] = 01019
tape[17] = 0000700201	celle[17] = 00001	celle[35] = 00430 <= KR
tape[18] = 0041100032		
tape[19] = 0000000001		

00430 ER HOP TIL CELLE
4 EFTER TRYK PÅ "START"

DASK REGISTRE (I UDVALG)

KR:	KONTROL REGISTER (UDPEGER ORDRE):	11 BITS
AR:	AKKUMULATOR:	41 BITS
MD:	MULTIPLIKAND:	40 BITS
MR:	MULTIPLIKATOR:	40 BITS

n^2 TEST KODEN

```

celle[0-1] = 0      n
celle[2-3] = 0      n2
                        NEXT n:
celle[4]   = 01140   AR := 1
celle[5]   = 00004   AR := MR := AR + n (= n + 1)
celle[6]   = 00008   n := AR (= n + 1)
celle[7]   = 0004A   AR_MR := n * MR (= n^2)
celle[8]   = 00040   AR := n
celle[9]   = 0010C   AR := AR shift 1 (= 2*n)
celle[10]  = 01101   AR := AR - 1 (= 2*n - 1)
celle[11]  = 00206   n2 := AR := n2 + AR (= n2 + 2*n - 1)
celle[12]  = 00007   AR := MR (mindst signifikante halvdel af n^2)
celle[13]  = 00201   AR := AR - n2
celle[14]  = 00411   if AR >= 0 then goto NEXT n
celle[15]  = 00032   stop;
celle[16]  = (ubrugt)
celle[17]  = 1      konstant

```

```

n := n2 := 0;
NEXT n:
  n := n + 1;
  n2 := n2 + n shift 1 - 1;
  if n*n - n2 >= 0 then
    goto NEXT n;
stop;

```

