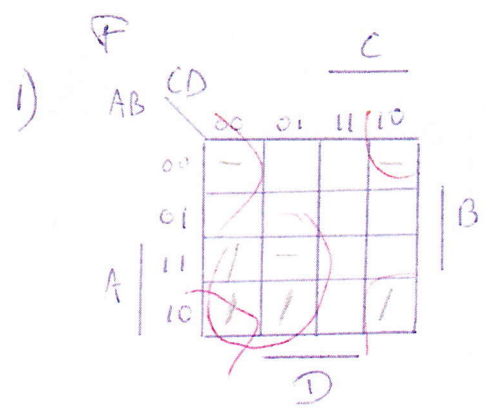


1



$$F = A \cdot \bar{C} + \bar{B} \cdot \bar{D}$$

- 2) ϕ_1 : Mealy
 ϕ_2 : 4

3) Fraction $1.\underbrace{\text{xxxx}}_{21 \text{ bits}}x_1 \Rightarrow$ decimal value ≥ 1
and < 2

$$q = \left[\frac{q}{8} \right] \times 8 \quad 2^3$$

$27 \uparrow \geq 1$

Fraction 1001 \Rightarrow bitpattern 001000...0
 Exponent $3 + 15 = 18_{10} \Rightarrow$ bitpattern 0000010010
 Sign bit 1

4)

(2)

| $F_1 F_0$ | \bar{X} | X | Z |
|-----------|-----------|-----|-----|
| 00 | 11 | 01 | 0 |
| 01 | 10 | 10 | 0 |
| 10 | 01 | 11 | 0 |
| 11 | 00 | 00 | 1 |

→

| $F_1 F_0 X$ | $F_1^+ F_0^+$ |
|-------------|---------------|
| 000 | 11 |
| 001 | 01 |
| 010 | 10 |
| 011 | 10 |
| 100 | 01 |
| 101 | 11 |
| 110 | 00 |
| 111 | 00 |

a)

↑

| | | | |
|--------|-------|---|---|
| | F_0 | | |
| DF_1 | 1 | 0 | 1 |
| F_1 | 0 | 1 | 0 |
| | X | | |

$$DF_1 = \bar{F}_1 \cdot \bar{X} + \bar{F}_1 \cdot F_0 + F_1 \cdot \bar{F}_0 \cdot X$$

b) $Z = F_1 \cdot F_0$

5) srl %R1, 10, %R3

figure 5-2

$\underbrace{1000}_8 \underbrace{0111}_7 \underbrace{0011}_3 \underbrace{0000}_0 \underbrace{0110}_6 \underbrace{0000}_0 \underbrace{0000}_0 \underbrace{1010}_A$

$0730600A_{16}$

6)

```

.begin
.org 0
sethi arr1, %r1
srl %r1, 10, %r1      ! %r1 begin address arr1 (source)
sethi arr2, %r2
srl %r2, 10, %r2      ! %r2 begin address arr2 (destination)
loop: ld[%r1], %r3     ! element of array in %r3
      addcc %r3, %r0, %r0 ! check status; result in %r0 (no change)
      be ready
      bneg skip          ! skip negative number
      st %r3, %r2        ! copy element
      addcc %r2, 4, %r2  ! next address in arr2
skip: addcc %r1, 4, %r1 ! next address in arr1
      ba loop
ready: st %r0, %r2     ! write terminating 0
      halt
.org 100
arr1: 12, -4, 9, 8, -23, 9, 0
.org 200
arr2:
.end

```

} $ld[100], \%r4$
 is not correct because
 the content of address
 100 is read.

7) RTL of micro instruction

```

500: %tempφ ← ORN (%Rφ, %tempφ)
501: %Rφ ← ADDCC (%tempφ, %Rφ)
502: %temp2 ← INC (%tempφ)

```

| | unit | after 500 | after 501 | after 502 |
|--------|------|----------------------|-----------------------|-----------------------|
| %Rφ | φ | φ | φ | φ |
| %tempφ | 10 | 111...1 ₂ | 1111...1 ₂ | 1111...1 ₂ |
| %temp1 | 20 | 20 | 20 | 20 |
| %temp2 | 30 | 30 | 30 | φ |