

Q1.

(a) 0111110 | 00011110 | 010001111001 | 0111110

(b) Before: 0111110 111110 1100011110 110111110

After: 11111100011111

Q2. 1 2 3 4 5 6 7 8 9 10 11 12

a. P1 P2 d1 P4 d2 d3 d4 P8 d5 d6 d7 d8
0 1 1 0 0 0 1 1 1 0 1 1

(b.)

i 1 1 1 0 0 0 1 0 1 0 1 1
checkbits c1: 1 c2: 0 c3: 0 c4: 1
so, bit index 9 is wrong

ii 0 1 1 1 0 0 1 1 0 1 1
checkbits: c1: 1, c2: 1, c3: 0, c4: 1
so, bit index 11 is wrong.

d3.

$$(a) \quad m(x) = 10110, \quad c(x) = 10101$$

$$n(x) = m(x) x^k = 101100000$$

$$r(x) = n(x) \bmod c(x) = 111$$

$$\begin{array}{r} 10101 \overline{) 101100000} \\ \underline{10101} \\ 00011000 \\ \underline{10101} \\ 011010 \\ \underline{10101} \\ 01111 \end{array}$$

$$n(x) = n(x) - r(x) = 10110111$$

$$(b) \quad r(x) = A(x) \bmod C(x)$$

i.

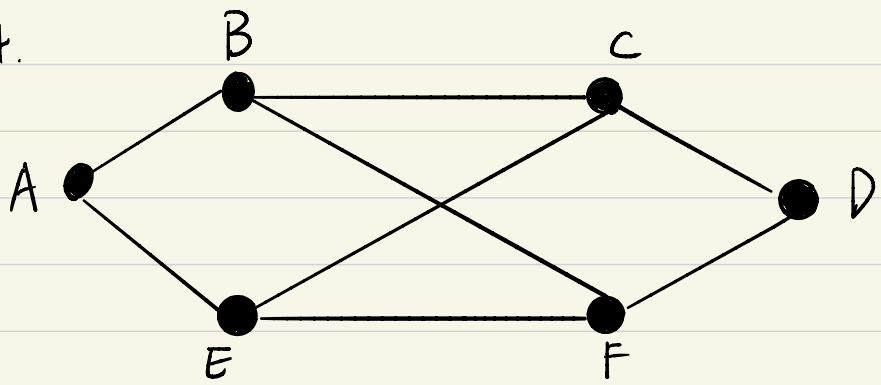
$$\begin{array}{r}
 10101 \overline{) 110101110} \\
 \underline{10101} \\
 01111 \\
 \underline{10101} \\
 010101 \\
 \underline{10101} \\
 10
 \end{array}$$

$r(x) = 0$, so this code is wrong

$$\begin{array}{r}
 ii. \ 10101 \overline{) 110101100} \\
 \underline{10101} \\
 11111 \\
 \underline{10101} \\
 10101 \\
 \underline{10101} \\
 00
 \end{array}$$

$r(x) \neq 0$, so this code is correct.

Q4.



5 5 4

Destination	cost B	D	E	Next
A	11	9	11	D
B	5	14	11	B
C	13	12	8	C
D	15	5	12	D
E	10	13	4	E
F	10	11	9	E

Q5

$$100\text{T bits} = 100 \times 2^{40} \text{ bits}$$

$$64\text{-bit number} = 2^{64} \times 2^3 \text{ bit/word} = 2^{67} \text{ bits}$$

$$\begin{aligned} \text{maximum lifetime} &= \frac{2^{67}}{100 \times 2^{40} \text{ bits/sec} \cdot 24 \text{ h} \cdot 3600 \text{ s}} \\ &= 15.534 \text{ days.} \end{aligned}$$

Q6.

Creation date: 1986-06-02 T04:00:00Z

Expiration date: 2021-07-31 T11:59:59Z

DNS servers : DNS-AUTH-01.OIT.DUKE.EDU
DNS-AUTH-02.OIT.DUKE.EDU
DNS-NCI-01.OIT.DUKE.EDU

* Screenshot on the next page.

WHOIS LOOKUP



duke.edu is already registered*

Domain Name: DUKE.EDU

Registry Domain ID: 5059_DOMAIN_EDU-VRSN

Registrar WHOIS Server: whois.educause.net

Registrar URL: <http://www.educause.edu/edudomain>

Updated Date: 2018-06-08T13:57:29Z

Creation Date: 1986-06-02T04:00:00Z

Registry Expiry Date: 2021-07-31T11:59:59Z

Registrar: Educause

Registrar IANA ID: 365

Registrar Abuse Contact Email:

Registrar Abuse Contact Phone:

Domain Status: clientDeleteProhibited <https://icann.org/epp#clientDeleteProhibited>

Domain Status: clientTransferProhibited <https://icann.org/epp#clientTransferProhibited>

Domain Status: clientUpdateProhibited <https://icann.org/epp#clientUpdateProhibited>

Name Server: DNS-AUTH-01.OIT.DUKE.EDU

Name Server: DNS-AUTH-02.OIT.DUKE.EDU

Name Server: DNS-NC1-01.OIT.DUKE.EDU

DNSSEC: unsigned

URL of the ICANN Whois Inaccuracy Complaint Form: <https://www.icann.org/wicf/>

>>> Last update of whois database: 2018-06-13T13:34:24Z <<<

```
ry70@vcm-12523:~/650$ echo -n -e "GET /awesome.txt HTTP/1.1\r\nHost:rabihiyounes.com\r\nConnection:close\r\n\r\n" | nc -v
rabihiyounes.com 80
Connection to rabihiyounes.com 80 port [tcp/http] succeeded!
HTTP/1.1 200 OK
Date: Tue, 11 Feb 2020 03:18:36 GMT
Server: Apache
Upgrade: h2,h2c
Connection: Upgrade, close
Last-Modified: Fri, 08 Feb 2019 18:43:41 GMT
Accept-Ranges: bytes
Content-Length: 2360
Cache-Control: max-age=604800
Expires: Tue, 18 Feb 2020 03:18:36 GMT
Vary: Accept-Encoding
X-Endurance-Cache-Level: 4
Content-Type: text/plain
```

