

Experiment 2

1) Network interface card:

(laptop, server) ... تستخدم في اي جهاز بالشبكة

2) Hubs:
 تستخدم في Physical Layer في الشبكة و collision و Broadcast

disadvantages of hubs?

1) collision (single)

2) Broadcast domain

3) switches:
 تستخدم في collision domain و Broadcast domain
 disadvantage: (Broadcast domain)

* MAC address *

4) Routers:
 تستخدم في Broadcast domain و MAC address

Memory types in Router?

- 1) ROM
- 2) RAM
- 3) Flash memory
- 4) NVRAM

التي تستخدم في الذاكرة

Router interface types

Management Ports

Network interfaces

لواجهة التي تستخدم في الواجهة
التي تستخدم في الواجهة



{ **cross over** → يوجد في device المتشاركة
straight Through → يوجد في device المنفصلة
console → يوجد في configuration بوضع command.
serial → Serial 0 في جهاز Ethernet. IP addr. بال Serial 0

* **تعيين رقمي** **ON** بعد تعيين IP address لكل device

* إذا بردي اشوف معلومات الشبكة التي عملت بها :

- 1) command prompt في كل
- 2) ipconfig / all يجب



EXP 3

Console cable: used this cable to do configuration

PC → R3 232

Router → console

* commands:

- 1) enable : to move from user mode to Privileged mode
- 2) configure : to enter configuration mode
* كمان اقدر اكتبه بلان و ارجو انك
- 3) exit : back to Privileged mode
* بعد اجزا التعداد و ارجو انك show das Privileged...
- 4) host name رسم : to name the router
- 5) @banner
@ banner motd * welcome to networks *
Password
- 6) enable secret cisco : الكتب باسور و كود ارجو انك
Privileged mode الى user mode من



EXP 3

7) pline console 0 }
① Password كلمة السر : اكتب باسورد كل ما يدي اذد
② login } user mode

8) interface اسم الجزء الذي يدي }
① IP address IP address : write IP address
② no shut down } for interfaces

9) show running configuration : يشوف كل التعداديات
ياي كملها

10) copy running configuration start :
to move from RAM to ~~RAM~~ NVRAM
* كمان ريفلا التعداديات وها ايلتصت جديد

11) show flash : Packup ~~files~~ files
يشوف اسم كل files

12) copy flash tftp : copy operating system
① file اسم file to tftp server
② IP address

Desktop → TFTP service → ياي file
كامله copy

13) reload startup config : اسم كل التعداديات
@ reload



EXP 4

ICMP → to test host and all devices in layer 3. uses Echo request-
~~used send~~

IPconfig → show (ip address, subnet mask, default gateway)

ipconfig /all → show more information

How to start ICMP ?

1) start → Programs → Accessories → Command Prompt → run → cmd.

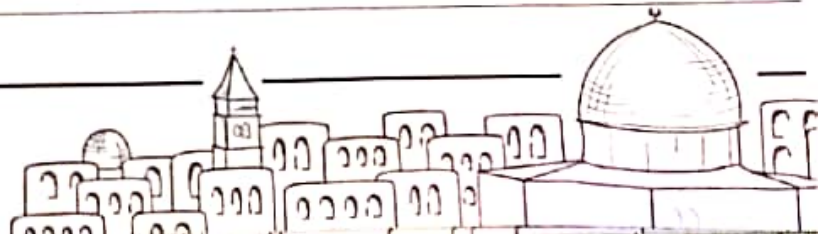
start → search cmd

2) Ping ip address

* we can ping host-name ^① and IP address ^② and web site. ^③

arp -a → to show the ~~ARP~~ ARP table (IP address and Mac) address

arp -d → arp table حذف



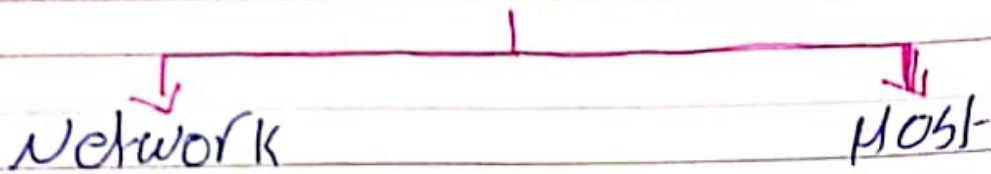
EXP 5

all IP address \rightarrow 32-bits , 265 value

Class A: 8 bits (Network) 24 bits (Hosts) ⁰⁻²⁵⁵
Class B: 16 bits (Network) 16 bits (Host)
Class C: 24 " " 8 " "

* تمام اسی قدر اور استعمال ہوتا ہے

IP address



Subnet mask اور IP address کی Host اور Network

Ex: 255.255.255.0



Network (1) بقا Host (0) بقا

Prefix length:

Ex:

255.0.0.0

18 \rightarrow بقا

11111111.00000000.00000000.00000000



Number of subnets $\rightarrow 2^n$: $n =$ bits borrowed
subnet mask (6 bits) 11 11 11

number of hosts $\rightarrow 2^{n-1}$

hosts 11 11 11 11 11 11 subnets 11 11 11 11 11 11 *

To know Network ID :

IP address

$\&$ \rightarrow logical anding

subnet mask

ex : ① IP address = 192.168.1.1 / 24

11000000 . 10100000 . 00000000 . 00000000

11111111 . 11111111 . 11111111 . 00000000 / subnet mask
= 255.255.255.0

= 192.168.1.0 ~~Network ID~~ Network ID

To know Broadcast ID :

Network ID for host

Broadcast ID for network
(1) 11 11 11 11 11 11

② Broadcast ID = 192.168.1.255



To know first usable address :

Network ID + 1

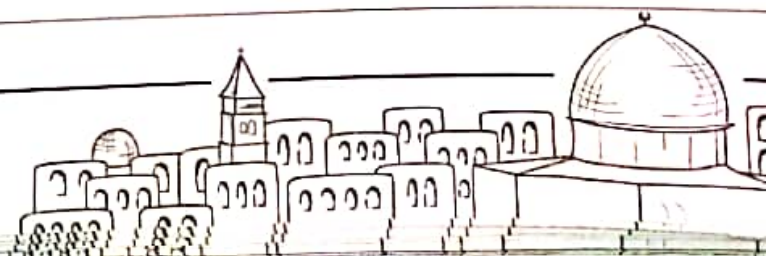
③ first usable address = 192.168.1.1

To know last usable address :

Broadcast ID - 1

④ = 192.168.1.255

* كذا لا جوبه فون حسب المثال السابق



* Network ID + $2^{\text{no of hosts bits}} - 1 = \text{Broadcast ID}$

8 bits for host $\rightarrow 2^8 = 256$ host per network
: ٢٥٦ هاست في شبكة واحدة حسب الطريقة الثانية

0 bit for subnet - 8 bits for hosts
($2^0 = 1$ subnet) - ($2^8 = 256$ host per subnet)

1 bit for subnet - 7 bits for hosts
($2^1 = 2$ subnet) - ($2^7 = 128$ host per subnet)

2 bit for subnet - 6 bit for hosts
($2^2 = 4$ subnet) - ($2^6 = 64$ host per subnet)

3 bit for subnet - 5 bit for hosts
($2^3 = 8$ subnet) - ($2^5 = 32$ host per subnet)

4 bit for subnet - 4 bit for hosts
= 16 = 16

5 bit for subnet - 3 bit for hosts
= 32 = 8

6 bit for subnet - 2 bit for hosts
= 64 = 4



IPv6:

کلاس و سبک انجمن و ایچ آی و آی وی 4

- 128 bits & 8 groups, every group 16 bits, 4 digits
- hexadecimal

2001:0db8:000a:0000 0000:0000:0000:0000

Prefix
(network)
64-bit

Interface ID
(host)
64-bit

- 2 rules to default IP address in IPv6:

- 1) omit leading zero ex: 09f0 → 9f0
- 2) Double colon ex: 2001:0db8:0000:1111:0000:0000:0000:0200



2001:db8:0:1111::200

* ما بقدر استند Double colon مرتین

