IOS basics – switches
Cabling systems
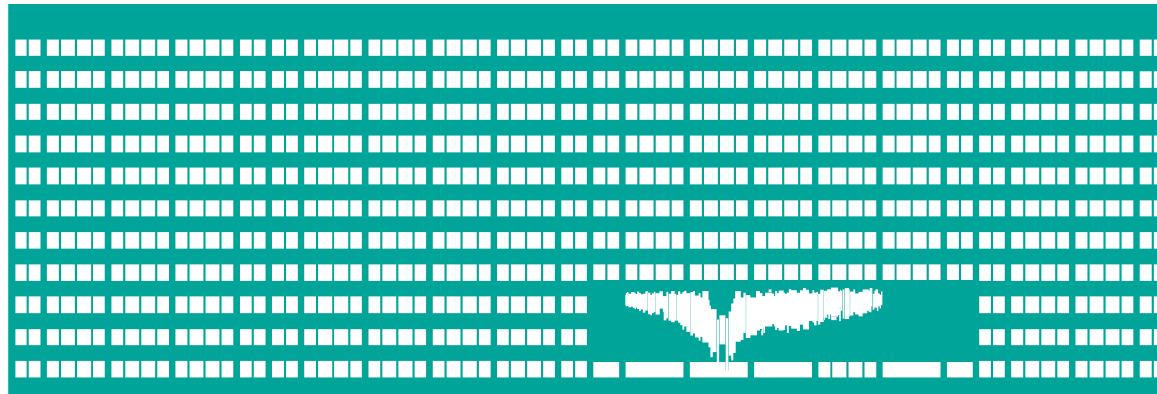
Computer networks
Seminar 2

Assignment

- Description: Interconnect two switches

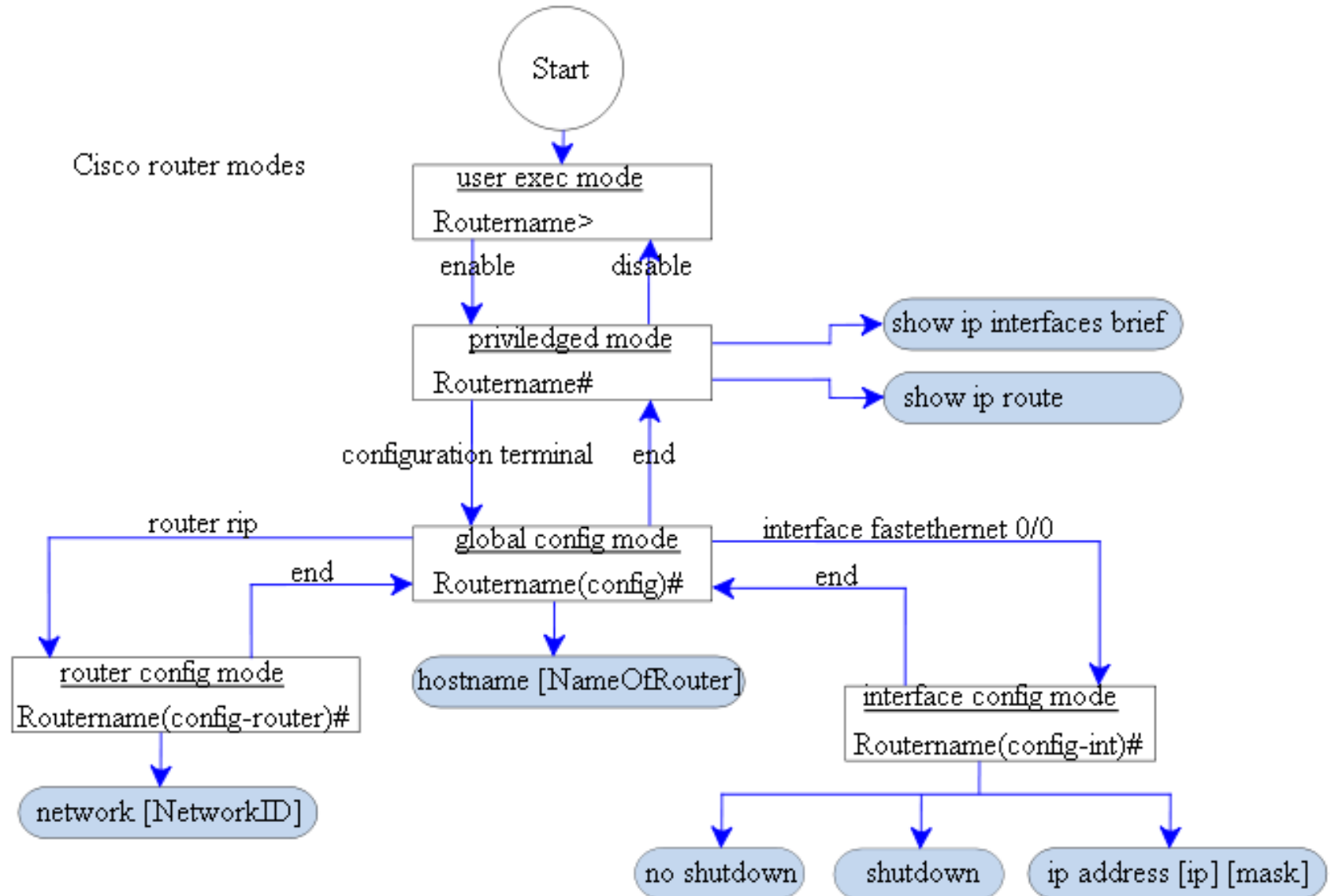

Straight-through cable

Cross-over cable

minicom

IOS principles

- IOS is operating system managing the device
- Configuration can be done
  - In text mode
  - Over WWW interface (works on many devices)
- During work with the device we can be in several modes. Depending on the mode there is different set of functions we are allowed to use.

Changing the modes

Notes

- If we don't know the exact syntax of command, we can help ourselfs using question mark. IOS tells us possibilities of the command.
  - For example: we don't know names of interfaces – IOS will show us available possibilities.
        show interface ?
- Sometimes it is not necessary to enter whole command but it is enough to enter only **unique part** (unique prefix) instead.
        sh int   *(show interface)*
- **TAB** key (tabulator) completes the command. (analogous to Unix based operating systems).
  - For example: if we write **sh**, tab will complete the command to **show**
- If you want to cancel the effect of configuration command, write down same command and put **no** before it.
- If you want to execute (without help) priviledged-mode command in configuration mode, prepend it with **do**

Basic commands of Cisco 2950

- Privileged mode
  - **show version** – version of the IOS
  - **show mac-address-table** – MAC address/CAM table
  - **clear mac-address-table dynamic** – clear CAM table
  - **show interface** [*<interface>*] – port information
  - **show run** – print complete configuration
  - **show cdp neigh** – neighbouring CISCO devices
- Configuration mode
  - **interface fastethernet0/1** – port configuration
    - **description** *<desc>* – port description
    - **duplex** {half|full|auto} – half/full duplex mode
    - **speed** {100|10|auto} – transmition speed
  - **hostname** *<name>* – device name
- **terminal length <NN>** – number of lines of the screen

Assignment – IOS

- Working with `minicom`
  - startup, help, shortcuts, closing
  - Serial port configuration, line wrapping
  - Capturing to file
- Cisco IOS
  - Moving between modes
    (`enable, conf t, ^Z, exit, disable`)
  - Interface, version, configuration info, etc.
    (`sh ver, sh run`) and configuration erase
  - Number of
    - screen lines (`terminal length YY`)
    - screen columns (`terminal width XX`)

Assignment – switch functions

- The example of automatic filling MAC address table (CAM)
  - Problem discussion
  - Displaying MAC address table entries (show `mac-address-table`)
  - Clearing MAC address table (clear `mac-address-table dynamic`)
- Interface statistics (show `int`)
- Displaying „Cisco" neighbours (show `cdp neighbours`)
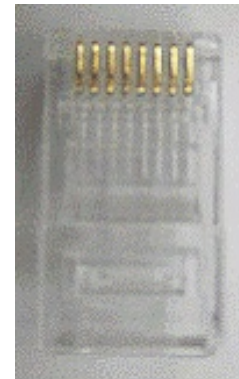
Metallic cables

- Coaxial cable + connector BNC, T, terminator
  - Thicknet (10 BASE 5) – up to 500 m
  - Thinnet (10 BASE 2) – up to 185 m
  - 50 ohm, 75 ohm
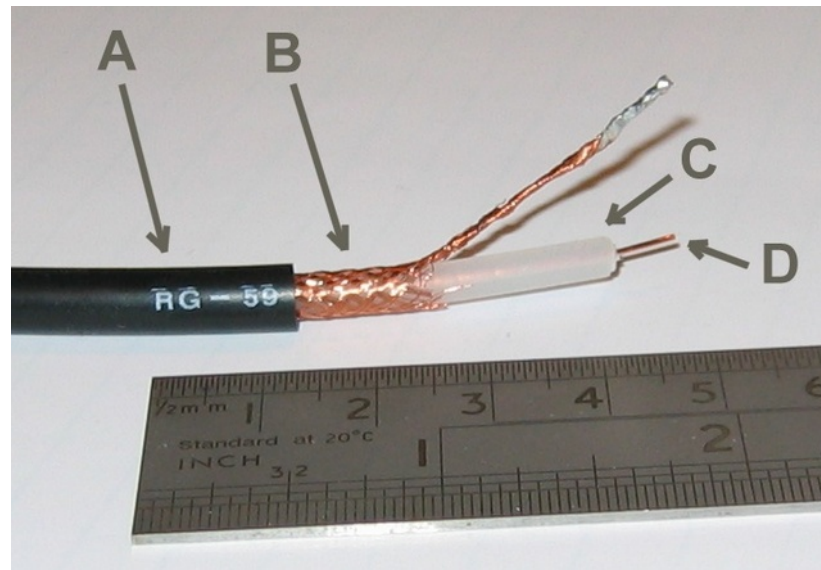
Metallic cables

- Twisted pair
  - UTP (Unshielded), FTP (Foil Screened) = ScTP, STP (Shielded)
  - RJ-45 connector
 - stranded vs solid wire

RJ-45   **RJ-11**

RJ-45 connector types

- Standard EIA/TIA 568A and 568B
  - USA: 568A – green pair on the left
  - Europe: 568B – orange pair on the left
- Cables
  - Straight – 568B connectors on both sides (in USA 568A)
  - Crossover – 568A on one side and 568B on the other – crossover of Tx (1,2) and Rx (3,6) pair
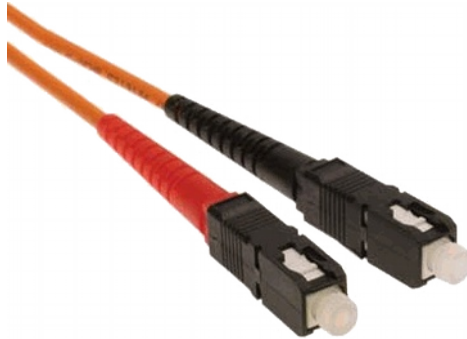 - Console – one side uses 568B connector, second one is turned by 180 degrees

PIN 1

PIN 1

568A

568B

console
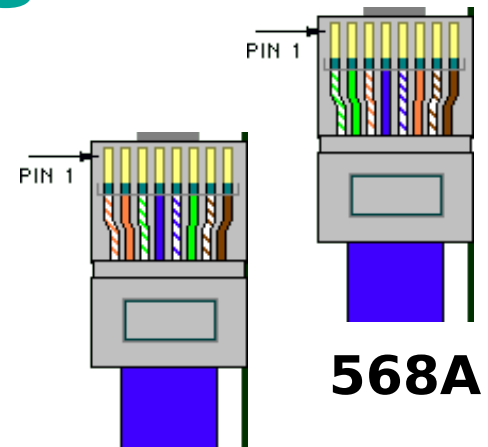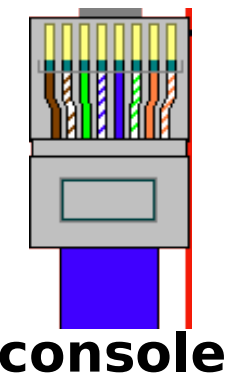
Optical cables

- Connectors ST, SC ...
- Single-mode, multi-mode

connector ST

connector SC
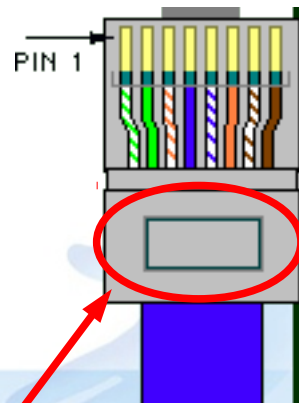
RJ-45 connector assembling

- Remove external isolation using carpet cutter **(Be careful not to cut the inside wires – short circuit)**
- Untwist the wires and order them by colors
- Push them into the connector in the way all of them are pushed to the end of the connector and external isolation is under the plastic clip.
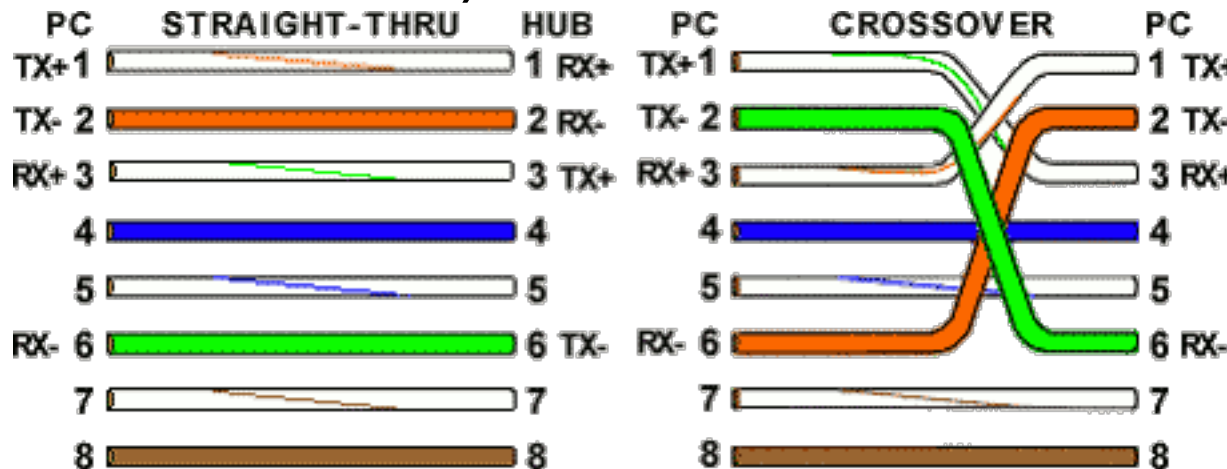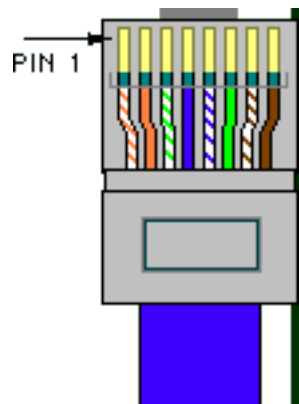- Use the connector pliers to clamp the connector

rotating

sliding

PIN 1

!!!

Assignment – assembling and verifying the functionality of the cables

- According to the teacher's instructions assembly straight/crossover cable and check the functionality using the tester
- Mark both ends of crossover cable with the sticky tape (near to the connectors)

Note: Let the teacher check your cable before using the pliers to clamp the conn.

Socket installation

- Remove external isolation using carpet cutter **(Be careful not to cut the inside wires – short circuit)**
- Untwist the wires and lay down them on the patch panel
- Use a punch tool to push a wire between two metal pins and to cut off the extra wire

Patch panel