10. a Configure network topology using switch and router (LAN, Internet).

```
#include <stdio.h>
#include <string.h>
#define LAN_IP "192.168.0.1"
#define INTERNET_IP "203.0.113.1"
#define SUBNET_MASK "255.255.255.0"
#define GATEWAY "192.168.0.1"

// Function to simulate the configuration of router interfaces
void configure_router(char* interface, char* ip_address, char* subnet_mask) {
printf("Configuring Router %s with IP: %s, Subnet: %s\n", interface, ip_address, subnet_mask);
}

// Function to simulate configuring a PC with an IP address and gateway
void configure_pc(char* pc_name, char* ip_address, char* gateway) {
printf("Configuring %s with IP: %s and Gateway: %s\n", pc_name, ip_address, gateway);
}

// Function to simulate Internet connectivity (NAT)
void configure_internet_access(char* router_ip) {
printf("Configuring NAT for Internet Access on Router, Router IP: %s\n", router_ip);
}

// Function to simulate LAN connectivity (Routing between LAN and Internet)
void configure_lan_connectivity(char* router_ip, char* lan_gateway) {
printf("Routing traffic from LAN (Gateway: %s) to Router with Internet IP: %s\n", lan_gateway,
router_ip);
}
```

```
// Function to simulate pinging between devices
void ping_device(char* source, char* destination) {
printf("Pinging from %s to %s...Success!\n", source, destination);
}

int main()
{
// Simulate Router Configuration
printf("Starting Network Configuration…\n");
configure_router("GigabitEthernet0/1", LAN_IP, SUBNET_MASK);  // LAN interface
configure_router("GigabitEthernet0/0", INTERNET_IP, "255.255.255.0");  // Internet interface

// Simulate Router Internet Access (NAT)
configure_ internet_access(INTERNET_IP);

// Simulate LAN Connectivity
configure_lan_connectivity(LAN_IP, GATEWAY);

// Simulate PC Configurations
configure_pc("PC1", "192.168.0.2", GATEWAY);
configure_pc("PC2", "192.168.0.3", GATEWAY);

// Simulate Ping Test from PC1 to Internet
ping_device("PC1", "Internet (203.0.113.1)");

// Simulate Ping Test from PC2 to Router
ping_device("PC2", "Router (192.168.0.1)");
printf("Network Configuration Complete!\n");

return 0;
}
```

b. Configure network topology to implement VLAN using packet tracer.

```
#include <stdio.h>
#include <string.h>
#define VLAN10 "VLAN10"
#define VLAN20 "VLAN20"

void configure_vlan(const char* vlan_name) {
printf("Creating and configuring %s on switch…\n", vlan_name);
)

void assign_port_to_vlan(int port, const char* vlan_name) {
printf("Assigning port Fa0/%d to %s..\n", port, vlan_name);
}

void configure_router_subinterface(const char* vlan_name, const char* ip_address) {
printf("Configuring Router sub-interface for %s with IP: %s\n", vlan_name, ip_address);
}

void configure_pc(int pc_id, const char* vlan_name, const char* ip_address, const char*
gateway){
printf("Configuring PC%d in %s with IP: %s and Gateway: %s\n", pc_id, vlan_name,
ip_address, gateway);
}

int main()
{
//Step 1: Create VLANS
configure_vlan(VLAN10);
configure_vlan(VLAN20);

// Step 2: Assign Switch Ports to VLANs
```

```
assign_port_to_vlan(1, VLAN10);
assign_port_to_vlan(2, VLAN10);
assign_port_to_vlan(3, VLAN20);
assign_port_to_vlan(4, VLAN20);

// Step 3: Configure Router for Inter-VLAN Routing
configure_router_subinterface(VLAN10, "192.168.10.1");
configure_router_subinterface(VLAN20, "192.168.20.1");

// Step 4: Configure PCs for VLANs
configure_pc(1, VLAN10, "192.168.10.2","192.168.10.1");
configure_pc(2, VLAN20, "192.168.20.2","192.168.20.1");

//Step 5: Display Completion Message
printf("VLAN Configuration Simulation Complete! \n");

return 0;
}
```