PA1 – nsclient README

Noor Abdelkader 318523602 Ameer Kayal 316201128

- Our nsclient code, got the DNS IP as a command line argument and check its syntax using ip_checker function.
- if the IP passed the syntax check, main_program function starts a loop to get input from user, and ends when get a quit.
  It expects to receive a domain name to get its ip address from DNS server.
- When got a user input, it checks if it is quit to finish. If not, it checks if it is a legal host name using Is_legal.
- dnsQuery creates a message requesting the IP address of the host name got from user, and receives a response and parses it to return hostent struct pointer.
- When returns, main program prints the firs IP address in the list (if exists) then wait for a user input again.

Note: Error messages matches the requested.

Implemented main functions:

ip_checker :

this function takes the ip from the user and checks if it's format is ligal.we hope the user gave us an ip with the format ##.##.##.## (4 numbers and 3 ponts between them) .where ## is a number <=255 and <=0 , else the ip is illegal.

This function start to take digits from ip until we reach point (.) and checks if the number legal , if it is we restart the calculation of the num , checks if the number of numbers on the ip still legal and checks if the number of points is legal . if it isn't we print that the ip isn't legal and the function return -1.
if the function reach the end of the ip and all the checks are ok, then the function return 0.

header_checker :

this functions checks each variable we have in the header in the following order:

1)first the function checks if the id of the received header equal to the id of the id_counter (the variable we save in the id of the massage we send).

2) the function checked if QR = 1 (QR of each massage we received should be 1 because we are the client side). If QR !=1 the function will return -1 and print an appropriate massage to the user.

3) the function checked if opcode = 0 (Opcode = 0 that's indicate we are the client side and we are the side that send the query). If opcode !=1 the function will return -1 and print an appropriate massage to the user.

4) the function saved each variable in the second line of header (this saves helped us as a programmers to check that each variable is as expected.).

5) the function checked what is the value of RCODE ,if Rpcode = 0 that's mean we have no Error else the function checks the value of Rcode and return -1 with appropriate massage.

6) the function checked if DQCOUNT = 1 (DQCOUNT of each massage we received should be 1 because we are the client side). If DQCOUNT !=1 the function will return -1 and print an appropriate massage to the user.

7)The function saved the value of ANCOUNT , NSCOUNT and ARCOUNT.

8) if all the checks passed the function will return ANCOUNT.

Is_legal :

This function checks if each label in the domain name is legal. This functions hopes that the each label start with a letter , ends with a letter or digit and each internal field is a letter , digit or _ .

If all the labels are legal the function will return true , else the function will return false.

convert_hostname :

this function takes the hostname and convert it to the appropriate encoding sequence of bytes , where each label is encoded by a leading byte indicating the length of the component , followed by a sequence of the label characters.

main_program:

this function implements the user interface of our nsclient program, and it calls dnsQuery to handle network messages.

dnsQuery:

builds a request message to get a response containing IP address from DNS server, then when a response is received, parses it and build a hostent struct and return its pointer.

send_msg_and_rcv_rspns:

sends a complete message to the DNS server and waits 2 seconds for a response, and put response in a buffer to let dnsQuery parse it.