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// This is the echo SERVER server.c
// cc -m32 server.c -o server
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include <sys/socket.h>
#include <netdb.h>

#define MAX 256

// Define variables:
struct sockaddr_in server_addr, client_addr, name_addr;
struct hostent *hp;

int sock, newsock;           // socket descriptors
int serverPort;              // server port number
int r, length, n;            // help variables

// Server initialization code:

int server_init(char *name)
{
    printf("===== server init =====\n");
    // get DOT name and IP address of this host

    printf("1 : get and show server host info\n");
    hp = gethostbyname(name);
    if (hp == 0){
        printf("unknown host\n");
        exit(1);
    }
    printf("    hostname=%s IP=%s\n",
        hp->h_name, inet_ntoa(*(long *)hp->h_addr));

    // create a TCP socket by socket() syscall
    printf("2 : create a socket\n");
    sock = socket(AF_INET, SOCK_STREAM, 0);
    if (sock < 0){
        printf("socket call failed\n");
        exit(2);
    }

    printf("3 : fill server_addr with host IP and PORT# info\n");
    // initialize the server_addr structure
    server_addr.sin_family = AF_INET;           // for TCP/IP
    server_addr.sin_addr.s_addr = htonl(INADDR_ANY); // THIS HOST IP address
    server_addr.sin_port = 0; // let kernel assign port

    printf("4 : bind socket to host info\n");
    // bind syscall: bind the socket to server_addr info
    r = bind(sock, (struct sockaddr *)&server_addr, sizeof(server_addr));
    if (r < 0){
        printf("bind failed\n");
        exit(3);
    }

    printf("5 : find out Kernel assigned PORT# and show it\n");
    // find out socket port number (assigned by kernel)
    length = sizeof(name_addr);
    r = getsockname(sock, (struct sockaddr *)&name_addr, &length);
    if (r < 0){
        printf("get sockname error\n");
        exit(4);
    }

    // show port number

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serverPort = ntohs(name_addr.sin_port);    // convert to host ushort
printf("    Port=%d\n", serverPort);

// listen at port with a max. queue of 5 (waiting clients)
printf("5 : server is listening ....\n");
listen(sock, 5);
printf("===== init done =====\n");
}

main(int argc, char *argv[])
{
    char *hostname;
    char line[MAX];

    if (argc < 2)
        hostname = "localhost";
    else
        hostname = argv[1];

    server_init(hostname);

    // Try to accept a client request
    while(1){
        printf("server: accepting new connection ....\n");

        // Try to accept a client connection as descriptor newsock
        length = sizeof(client_addr);
        newsock = accept(sock, (struct sockaddr *)&client_addr, &length);
        if (newsock < 0){
            printf("server: accept error\n");
            exit(1);
        }
        printf("server: accepted a client connection from\n");
        printf("-----\n");
        printf("        IP=%s  port=%d\n", inet_ntoa(client_addr.sin_addr.s_addr),
            ntohs(client_addr.sin_port));
        printf("-----\n");

        // Processing loop
        while(1){
            n = read(newsock, line, MAX);
            if (n==0){
                printf("server: client died, server loops\n");
                close(newsock);
                break;
            }

            // show the line string
            printf("server: read n=%d bytes; line=[%s]\n", n, line);

            // Now we add the 2 numbers
            char *string = strtok(line, " \n");
            int a,b;
            if(string != NULL){
                printf("Var A '%s'\n", string);
                a = strtol(string, (char **)NULL, 10);
                string = strtok(NULL, " \n");
                if(string != NULL && a != 0){
                    printf("String '%s'\n", string);
                    b = strtol(string, (char **)NULL, 10);
                    if(b != 0){
                        int c = a + b;
                        sprintf(line, "Sum %d + %d = %d", a, b, c);
                    }
                }
            }
        }
    }
}

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//          strcat(line, " ECHO"); didn't want to add this anymore

// send the echo line to client
n = write(newsock, line, MAX);

printf("server: wrote n=%d bytes; ECHO=[%s]\n", n, line);
printf("server: ready for next request\n");
    }
}
}
```