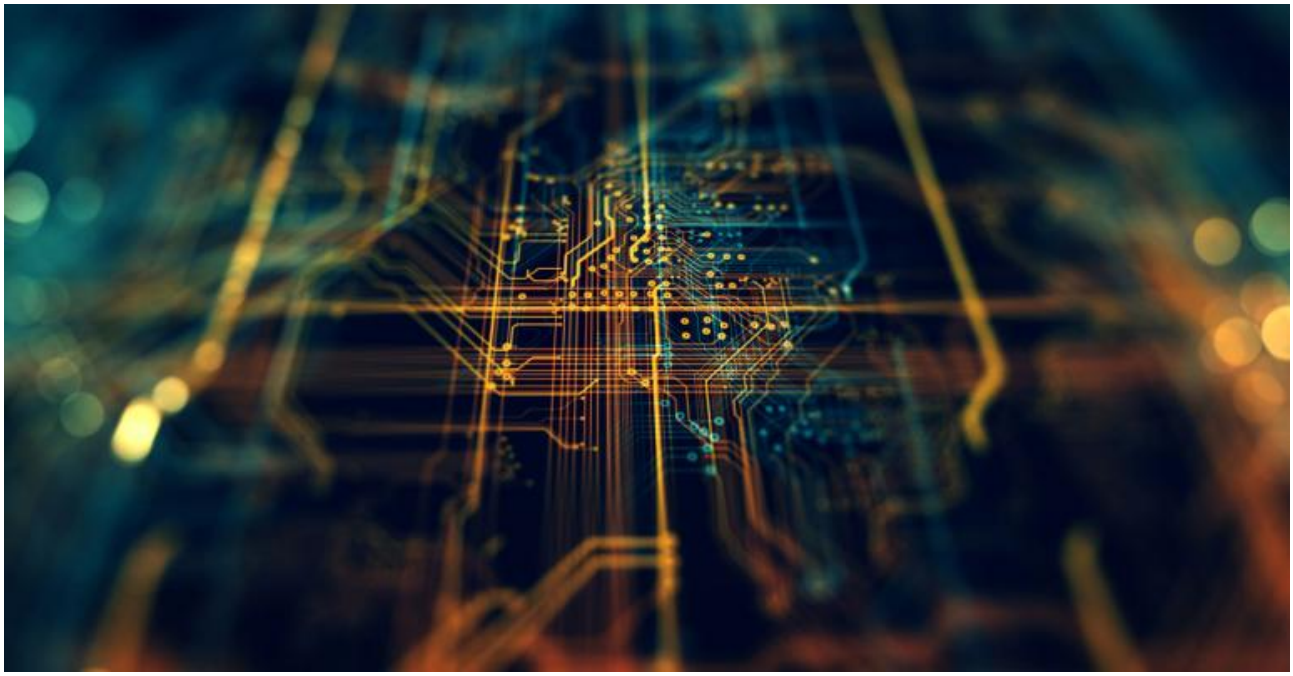
TI DSP, MCU 및 Xilinx Zynq FPGA 프로그래밍 전문가 과정



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mpecho_serv.c//

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<unistd.h>
#include<signal.h>
#include<sys/wait.h>
#include<arpa/inet.h>
#include<sys/socket.h>

typedef struct sockaddr_in si;
typedef struct sockaddr * sap;

#define BUF_SIZE        32

void err_handler(char* msg)
{
        fputs(msg, stderr);
        fputc('\n', stderr);
        exit(1);
}

void read_childproc(int sig)
{
        pid_t pid;
        int status;
        pid = waitpid(-1, &status, WNOHANG);
        printf("Removed proc id: %d\n", pid);
}

int main(int argc, char** argv)
{
        int serv_sock,clnt_sock;
        si serv_addr,clnt_addr;
        pid_t pid;
```

```
	struct sigaction act;
	socklen_t addr_size;
	int str_len, state;
	char buf[BUF_SIZE] = {0};

	if(argc != 2)
	{
		printf("use: %s <port>\n", argv[0]);
		exit(1);
	}

	act.sa_handler = read_childproc;
	sigemptyset(&act.sa_mask);
	act.sa_flags = 0;
	state = sigaction(SIGCHLD, &act, 0);

	serv_sock = socket(PF_INET, SOCK_STREAM, 0);

	if(serv_sock == -1)
		err_handler("socket() error");

	memset(&serv_addr, 0, sizeof(serv_addr));
	serv_addr.sin_family = AF_INET;
	serv_addr.sin_addr.s_addr = htonl(INADDR_ANY);
	serv_addr.sin_port = htons(atoi(argv[1]));

	if(bind(serv_sock,  (sap)&serv_addr,  sizeof(serv_addr))  ==
-1)
		err_handler("bind() error");

	if(listen(serv_sock, 5) == -1)
		err_handler("listen() error");

	for(;;)
	{
```

```
            addr_size = sizeof(clnt_addr);
            clnt_sock = accept(serv_sock, (sap)&clnt_addr,
&addr_size);
            if(clnt_sock == -1)
                  continue;
            else
                  puts("New Client Connected ...");
            pid = fork();
            if(pid == -1)
            {
                  close(clnt_sock);
                  continue;
            }
            if(pid == 0)
            {
                  close(serv_sock);

                  while((str_len = read(clnt_sock, buf, BUF_SIZE)) !
= 0)
                        write(clnt_sock, buf, str_len);

                  close(clnt_sock);
                  puts("Client Disconnected ...");
                  return 0;
            }
            else
            close(clnt_sock);
      }
      close(serv_sock);

      return 0;
}
```

mpecho_clnt.c

```
#include<stdio.h>
#include<string.h>
#include<fcntl.h>
#include<stdlib.h>
#include<unistd.h>
#include<arpa/inet.h>
#include<sys/socket.h>

typedef struct sockaddr_in si;
typedef struct sockaddr * sap;

#define BUF_SIZE        32

void err_handler(char* msg)
{
        fputs(msg, stderr);
        fputc('\n',stderr);
        exit(1);
}

void read_routine(int sock, char *buf)
{
        for(;;)
        {
                int str_len = read(sock, buf, BUF_SIZE);

                if(str_len == 0)
                        return;

                buf[str_len] = 0;
                printf("msg from server: %s", buf);
        }
}
```

```
void write_routine(int sock, char* buf)
{
	for(;;)
	{
		fgets(buf, BUF_SIZE, stdin);

		if(!strcmp(buf, "q\n") || !strcmp(buf, "Q\n"))
		{
			shutdown(sock, SHUT_WR);
			return;
		}

		write(sock, buf, strlen(buf));
	}
}

int main(int argc, char** argv)
{
	pid_t pid;
	int i, sock;
	si serv_addr;
	char buf[BUF_SIZE] = {0};

	if(argc != 3)
	{
		printf("use: %s <IP> <port>\n", argv[0]);
		exit(1);
	}

	sock = socket(PF_INET, SOCK_STREAM, 0);

	if(sock == -1)
		err_handler("socket() error");
```

```
        memset(&serv_addr, 0, sizeof(serv_addr));
        serv_addr.sin_family = AF_INET;
        serv_addr.sin_addr.s_addr = inet_addr(argv[1]);
        serv_addr.sin_port = htons(atoi(argv[2]));

        if(connect(sock, (sap)&serv_addr, sizeof(serv_addr)) == -1)
                err_handler("connecct() error");

        else
                puts("connected ......");

        pid = fork();

        if(pid == 0)
                write_routine(sock, buf);
        else
                read_routine(sock, buf);

        close(sock);

        return 0;

}
```

chat_clnt.c//채팅 서버코드

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<unistd.h>
#include<pthread.h>
#include<arpa/inet.h>
#include<sys/socket.h>
#include<sys/epoll.h>

#define BUF_SIZE        200000
#define NAME_SIZE    32

typedef struct sockaddr_in si;
typedef struct sockaddr * sap;

char name[NAME_SIZE] = "[DEFAULT]";
char msg[BUF_SIZE];

void err_handler(char* msg)
{
        fputs(msg, stderr);
        fputc('\n',stderr);
        exit(1);
}

void * send_msg(void* arg)
{
        int sock = *((int*)arg);
        char name_msg[NAME_SIZE + BUF_SIZE];
        int i;
        for(;;)
        {
                //fgets(msg, BUF_SIZE, stdin);
```

```
            if(!strcmp(msg, "q\n") || !strcmp(msg, "Q\n"));
            {
                close(sock);
                exit(0);
            }
            for(i = 0; i < 1024; i++){
                msg[i] = '!';
            }
            write(sock, msg, strlen(msg));
            sprintf(name_msg, "%s %s", name, msg);
            write(sock, name_msg, strlen(name_msg));
        }

        return NULL;
}
void* recv_msg(void* arg){
        int sock = *((int*)arg);
        char name_msg[NAME_SIZE + BUF_SIZE];
        int str_len;

        for(;;){
            str_len = read(sock, name_msg, NAME_SIZE +
BUF_SIZE - 1);

            if(str_len==-1)
                return (void*)-1;

            name_msg[str_len] = 0;
            fputs(name_msg, stdout);
        }
        return NULL;
}

int main(int argc, char** argv)
{
```

```
	int sock;
	si serv_addr;
	pthread_t snd_thread, rcv_thread;
	void* thread_ret;

	if(argc != 4){
		printf("Usage: %s <IP> <port> <name>\n",argv[0]);
		exit(1);
	}
	sprintf(name,"[%s]", argv[3]);
	sock = socket(PF_INET, SOCK_STREAM, 0);

	if(sock == -1)
		err_handler("socket() error");

	memset(&serv_addr, 0,sizeof(serv_addr));
	serv_addr.sin_family = AF_INET;
	serv_addr.sin_addr.s_addr = inet_addr(argv[1]);
	serv_addr.sin_port = htons(atoi(argv[2]));

	if(connect(sock, (sap)&serv_addr, sizeof(serv_addr)) == -1)
		err_handler("connect() error");

	pthread_create(&snd_thread, NULL, send_msg,
(void*)&sock);
	pthread_create(&snd_thread, NULL, recv_msg,
(void*)&sock);
	pthread_join(snd_thread, &thread_ret);
	pthread_join(rcv_thread, &thread_ret);

	close(sock);
	return 0;
}
```

chat_serv.c//채팅 클라이언트 코드

```
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
#include<fcntl.h>
#include<sys/socket.h>
#include<arpa/inet.h>
#include<sys/epoll.h>
#include<pthread.h>
#include<unistd.h>

#define BUF_SIZE 128
#define MAX_CLNT    256

typedef struct sockaddr_in    si;
typedef struct sockaddr *      sp;

int clnt_cnt = 0;
int clnt_socks[MAX_CLNT];
pthread_mutex_t mtx;

void err_handler(char* msg)
{
	fputs(msg, stderr);
	fputc('\n',stderr);
	exit(1);
}

void send_msg(char* msg, int len)
{
	int i;
	pthread_mutex_lock(&mtx);

	for(i = 0; i < clnt_cnt; i++)
		write(clnt_socks[i], msg, len);
```

```
	pthread_mutex_unlock(&mtx);
}

void *clnt_handler(void* arg)
{
	int clnt_sock = *((int*)arg);
	int str_len =0, i;
	char msg[BUF_SIZE];

	while((str_len = read(clnt_sock, msg, sizeof(msg))) != 0)
		send_msg(msg, str_len);

	pthread_mutex_lock(&mtx);

	for(i = 0; i < clnt_cnt; i++)
	{
		if(clnt_sock == clnt_socks[i])
		{
			while(i++ < clnt_cnt -1)
				clnt_socks[i] = clnt_socks[i + 1];
			break;
		}
	}

	clnt_cnt--;
	pthread_mutex_unlock(&mtx);
	close(clnt_sock);

	return NULL;

}

int main(int argc, char** argv)
{
```

```
	int serv_sock, clnt_sock;
	si serv_addr, clnt_addr;
	socklen_t addr_size;
	pthread_t t_id;

	if(argc !=2)
	{
		printf("Usage: %s <port>\n", argv[0]);
		exit(1);
	}

	pthread_mutex_init(&mtx, NULL);

	serv_sock = socket(PF_INET, SOCK_STREAM, 0);

	if(serv_sock ==-1)
		err_handler("socket() error");

	memset(&serv_addr, 0, sizeof(serv_addr));
	serv_addr.sin_family = AF_INET;
	serv_addr.sin_addr.s_addr = htonl(INADDR_ANY);
	serv_addr.sin_port = htons(atoi(argv[1]));

	if(bind(serv_sock, (sp)&serv_addr, sizeof(serv_addr)) == -1)
		err_handler("bind() error");

	if(listen(serv_sock,10) == -1)
		err_handler("listen() error");

	for(;;)
	{
		addr_size = sizeof(clnt_addr);
		clnt_sock = accept(serv_sock, (sp)&clnt_addr,
&addr_size);
```

```
		pthread_mutex_lock(&mtx);
		clnt_socks[clnt_cnt++] = clnt_sock;
		pthread_mutex_unlock(&mtx);

		pthread_create(&t_id, NULL, clnt_handler,
(void*)&clnt_sock);
		pthread_detach(t_id);
		printf("Connected Client IP: %s\n",
inet_ntoa(clnt_addr.sin_addr));
	}
	close(serv_sock);
	return 0;
}
```

common.h

```
#ifndef __COMMON_H__
#define __COMMON_H__

#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
#include <arpa/inet.h>
#include <sys/socket.h>

typedef struct sockaddr_in	si;
typedef struct sockaddr *	sp;

typedef struct __d{
	int data;
	float fdata;
} d;

#define BUF_SIZE		32
```

```
#endif
```

struct_clnt.c//구조체를 주고받는 클라이언트 코드

```
#include "common.h"

void err_handler(char *msg)
{
	fputs(msg, stderr);
	fputc('\n', stderr);
	exit(1);
}

void read_proc(int sock, d *buf)
{
	for(;;)
	{
		int len = read(sock, buf, BUF_SIZE);

		if(!len)
			return;

		printf("msg from serv: %d, %f\n", buf->data, buf->fdata);
	}
}

void write_proc(int sock, d *buf)
{
	char msg[32] = {0};

	for(;;)
	{
		fgets(msg, BUF_SIZE, stdin);
```

```
            if(!strcmp(msg, "q\n") || !strcmp(msg, "Q\n"))
            {
                shutdown(sock, SHUT_WR);
                return;
            }

            buf->data = 3;
            buf->fdata = 7.7;

            write(sock, buf, sizeof(d));
        }
}

int main(int argc, char **argv)
{
        pid_t pid;
        int i, sock;
        si serv_addr;
        d struct_data;
        char buf[BUF_SIZE] = {0};

        if(argc != 3)
        {
            printf("use: %s <IP> <port>\n", argv[0]);
            exit(1);
        }

        sock = socket(PF_INET, SOCK_STREAM, 0);

        if(sock == -1)
            err_handler("socket() error");

        memset(&serv_addr, 0, sizeof(serv_addr));
        serv_addr.sin_family = AF_INET;
        serv_addr.sin_addr.s_addr = inet_addr(argv[1]);
```

```
	serv_addr.sin_port = htons(atoi(argv[2]));

	if(connect(sock, (sp)&serv_addr, sizeof(serv_addr)) == -1)
		err_handler("connect() error");
	else
		puts("Connected!\n");

	pid = fork();

	if(!pid)
		write_proc(sock, (d *)&struct_data);
	else
		read_proc(sock, (d *)&struct_data);

	close(sock);

	return 0;
}
```

struct_serv.c//구조체를 주고받는 서버코드

```
#include "common.h"
#include <signal.h>
#include <sys/wait.h>

typedef struct sockaddr_in	si;
typedef struct sockaddr *	sp;

void err_handler(char *msg)
{
	fputs(msg, stderr);
	fputc('\n', stderr);
	exit(1);
}

void read_cproc(int sig)
```

```
{
	pid_t pid;
	int status;
	pid = waitpid(-1, &status, WNOHANG);
	printf("Removed proc id: %d\n", pid);
}

int main(int argc, char **argv)
{
	int serv_sock, clnt_sock, len, state;
	char buf[BUF_SIZE] = {0};
	si serv_addr, clnt_addr;
	struct sigaction act;
	socklen_t addr_size;
	d struct_data;
	pid_t pid;

	if(argc != 2)
	{
		printf("use: %s <port>\n", argv[0]);
		exit(1);
	}

	act.sa_handler = read_cproc;
	sigemptyset(&act.sa_mask);
	act.sa_flags = 0;
	state = sigaction(SIGCHLD, &act, 0);

	serv_sock = socket(PF_INET, SOCK_STREAM, 0);

	if(serv_sock == -1)
		err_handler("socket() error");

	memset(&serv_addr, 0, sizeof(serv_addr));
	serv_addr.sin_family = AF_INET;
```

```
	serv_addr.sin_addr.s_addr = htonl(INADDR_ANY);
	serv_addr.sin_port = htons(atoi(argv[1]));

	if(bind(serv_sock, (sp)&serv_addr, sizeof(serv_addr)) == -1)
		err_handler("bind() error");

	if(listen(serv_sock, 5) == -1)
		err_handler("listen() error");

	for(;;)
	{
		addr_size = sizeof(clnt_addr);
		clnt_sock = accept(serv_sock, (sp)&clnt_addr,
&addr_size);

		if(clnt_sock == -1)
			continue;
		else
			puts("New Client Connected!\n");

		pid = fork();

		if(pid == -1)
		{
			close(clnt_sock);
			continue;
		}

		if(!pid)
		{
			close(serv_sock);

			while((len = read(clnt_sock, (d *)&struct_data,
BUF_SIZE)) != 0)
			{
```

```
                        printf("struct.data = %d, struct.fdata = %f\n",
struct_data.data, struct_data.fdata);
                        write(clnt_sock, (d *)&struct_data, len);
                }

                close(clnt_sock);
                puts("Client Disconnected!\n");
                return 0;
        }
        else
                close(clnt_sock);
    }
    close(serv_sock);

    return 0;
}
```

gethostbyaddr.c//아이피주소로 도메인네임을 찾는것

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<unistd.h>
#include<arpa/inet.h>
#include<netdb.h>

typedef struct sockaddr_in si;

void err_handler(char* msg)
{
    fputs(msg, stderr);
    fputc('\n',stderr);
    exit(1);
}

int main(int argc, char** argv)
```

```
{
	int i;
	si addr;
	struct hostent* host;

	if(argc !=2)
	{
		printf("use: %s <port>\n",argv[0]);
		exit(1);
	}

	memset(&addr, 0, sizeof(addr));
	addr.sin_addr.s_addr = inet_addr(argv[1]);
	host = gethostbyaddr((char*)&addr.sin_addr, 4, AF_INET);

	if(!host)
		err_handler("gethost error!");

	printf("Official Name: %s\n", host->h_name);

	for(i = 0; host->h_aliases[i]; i++)
		printf("Aliases %d: %s\n", i + 1, host->h_aliases[i]);

	printf("Address Type: %s\n",
		(host->h_addrtype == AF_INET) ? "AF_INET" :
"AF_INET6");

	for(i = 0; host->h_addr_list[i]; i++)
		printf("IP Addr %d: %s\n", i + 1,
			inet_ntoa(*(struct in_addr*)host->h_addr_list[i]));

	return 0;
}
```