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Course: Network and Communication CSE1004

Digital Assignment 5

TCP

CODE-> SERVER

```
#include <stdio.h>

#include <sys/types.h>

#include <sys/socket.h>

#include <netinet/in.h>

void error(char *msg){

    perror(msg);

    exit(1);

}

int main(int argc, char *argv[]){

    int sockfd, newsockfd, portno, clien;

    char buffer[256];

    struct sockaddr_in serv_addr, cli_addr;

    int n;

    if (argc < 2){

        fprintf(stderr,"ERROR, no port provided\n");

        exit(1);

    }

    sockfd = socket(AF_INET, SOCK_STREAM, 0);

    if (sockfd < 0){

        error("ERROR opening socket");

    }

    bzero((char *) &serv_addr, sizeof(serv_addr));

    portno = atoi(argv[1]);

    serv_addr.sin_family = AF_INET;
```

```

serv_addr.sin_addr.s_addr = INADDR_ANY;
serv_addr.sin_port = htons(portno);
if (bind(sockfd, (struct sockaddr *) &serv_addr, sizeof(serv_addr)) < 0){
    error("ERROR on binding");
}
listen(sockfd,5);
clilen = sizeof(cli_addr);
newsockfd = accept(sockfd,(struct sockaddr *) &cli_addr, &clilen);
if (newsockfd < 0){
    error("ERROR on accept");
}
bzero(buffer,256);
n = read(newsockfd,buffer,255);
if (n < 0){
    error("ERROR reading from socket");
}
printf("Here is the message: %s\n",buffer);
n = write(newsockfd,"I got your message",18);
if (n < 0){
    error("ERROR writing to socket");
}
return 0;
}

```

CODE-> CLIENT

```

#include <stdio.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netdb.h>
#include <string.h>
void error(char *msg){

```

```

    perror(msg);
    exit(0);
}

int main(int argc, char *argv[]){
    int sockfd, portno, n;
    struct sockaddr_in serv_addr;
    struct hostent *server;
    char buffer[256];
    if (argc < 3){
        fprintf(stderr,"usage %s hostname port\n", argv[0]);
        exit(0);
    }
    portno = atoi(argv[2]);
    sockfd = socket(AF_INET, SOCK_STREAM, 0);
    if (sockfd<0){
        error("Error opening socket");
    }
    server = gethostbyname(argv[1]);
    if (server == NULL) {
        fprintf(stderr, "ERROR no such host\n");
        exit(0);
    }
    bzero((char*) &serv_addr, sizeof(serv_addr));
    serv_addr.sin_family=AF_INET;
    bcopy((char*)server->h_addr,(char*)&serv_addr.sin_addr.s_addr,server->h_length);
    serv_addr.sin_port=htons(portno);
    if (connect(sockfd, &serv_addr, sizeof(serv_addr))<0){
        error("ERROR connecting");
    }
    printf("Enter the message: ");
    bzero(buffer,256);

```

```

fgets(buffer,255,stdin);

n=write(sockfd,buffer,strlen(buffer));

if (n<0){

    error("ERROR writing to socket");

}

printf("%s\n",buffer);

return 0;

}

```

SCREENSHOTS

```

gaurav1020@DESKTOP-R0RPIEK: ~/CN/TCP
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ gcc server.c -o server
server.c: In function 'error':
server.c:7:2: warning: implicit declaration of function 'exit' [-Wimplicit-function-declaration]
   7 |     exit(1);
     |     ^~~~~
server.c:7:2: warning: incompatible implicit declaration of built-in function 'exit'
server.c:5:1: note: include <stdlib.h> or provide a declaration of 'exit'
   4 | #include <netinet/in.h>
     | ^~~~~
+++ #include <stdlib.h>
   5 | void error(char *msg){
server.c: In function 'main':
server.c:16:3: warning: incompatible implicit declaration of built-in function 'exit'
   16 |     exit(1);
      |     ^~~~~
server.c:16:3: note: include <stdlib.h> or provide a declaration of 'exit'
server.c:22:2: warning: implicit declaration of function 'bzero' [-Wimplicit-function-declaration]
   22 |     bzero((char *) &serv_addr, sizeof(serv_addr));
      |     ^~~~~
server.c:22:2: warning: incompatible implicit declaration of built-in function 'bzero'
server.c:23:11: warning: implicit declaration of function 'atoi' [-Wimplicit-function-declaration]
   23 |     portno = atoi(argv[1]);
      |             ^~~~~
server.c:37:6: warning: implicit declaration of function 'read'; did you mean 'fread'? [-Wimplicit-function-declaration]
   37 |     n = read(sockfd,buffer,255);
      |         ^~~~~
server.c:42:6: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   42 |     n = write(sockfd,"I got your message",18);
      |         ^~~~~
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ ./server 4547

gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ gcc client.c -o client
client.c: In function 'error':
client.c:9:2: warning: implicit declaration of function 'exit' [-Wimplicit-function-declaration]
   9 |     exit(0);
     |     ^~~~~
client.c:9:2: warning: incompatible implicit declaration of built-in function 'exit'
client.c:7:1: note: include <stdlib.h> or provide a declaration of 'exit'
   6 | #include <string.h>
     | ^~~~~
+++ #include <stdlib.h>
   7 | void error(char *msg){
client.c: In function 'main':
client.c:18:3: warning: incompatible implicit declaration of built-in function 'exit'
   18 |     exit(0);
      |     ^~~~~
client.c:18:3: note: include <stdlib.h> or provide a declaration of 'exit'
client.c:20:11: warning: implicit declaration of function 'atoi' [-Wimplicit-function-declaration]
   20 |     portno = atoi(argv[2]);
      |             ^~~~~
client.c:28:3: warning: incompatible implicit declaration of built-in function 'exit'
   28 |     exit(0);
      |     ^~~~~
client.c:28:3: note: include <stdlib.h> or provide a declaration of 'exit'
client.c:34:22: warning: passing argument 2 of 'connect' from incompatible pointer type [-W incompatible-pointer-types]
   34 |     if (connect(sockfd, &serv_addr, sizeof(serv_addr))<0){
      |                      ^~~~~~
      |                      |
      |                      struct sockaddr_in *
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:126:52: note: expected 'const struct sockaddr *' but argument
is of type 'struct sockaddr_in *'
   126 | extern int connect(int __fd, __CONST_SOCKADDR_ARG __addr, socklen_t __len);
      |
client.c:40:4: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   40 |     n=write(sockfd,buffer,strlen(buffer));
      |     ^~~~~
      |     |
      |     fwrite
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-R0RPIEK:~/CN/TCP$ ./client localhost 4547
Enter the message:

```

```
gaurav1020@DESKTOP-RORPIEK: ~/CN/TCP
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ gcc server.c -o server
server.c: In function 'error':
server.c:7:2: warning: implicit declaration of function 'exit' [-Wimplicit-function-declaration]
  7 |     exit(1);
    |     ^~~~~
server.c:7:2: warning: incompatible implicit declaration of built-in function 'exit'
server.c:5:1: note: include <stdlib.h> or provide a declaration of 'exit'
  4 | #include <netinet/in.h>
    | ^~~~~
+++ | #include <stdlib.h>
  5 | void error(char *msg){
server.c: In function 'main':
server.c:16:3: warning: incompatible implicit declaration of built-in function 'exit'
  16 |     exit(1);
     |     ^~~~~
server.c:16:3: note: include <stdlib.h> or provide a declaration of 'exit'
server.c:22:2: warning: implicit declaration of function 'bzero' [-Wimplicit-function-declaration]
  22 |     bzero((char *) &serv_addr, sizeof(serv_addr));
     |     ^~~~~
server.c:22:2: warning: incompatible implicit declaration of built-in function 'bzero'
server.c:23:11: warning: implicit declaration of function 'atoi' [-Wimplicit-function-declaration]
  23 |     portno = atoi(argv[1]);
     |             ^~~~~
server.c:37:6: warning: implicit declaration of function 'read'; did you mean 'fread'? [-Wimplicit-function-declaration]
  37 |     n = read(newsockfd, buffer, 255);
     |         ^~~~~
server.c:42:6: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
  42 |     n = write(newsockfd, "I got your message", 18);
     |         ^~~~~
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ ls
client client.c server server.c
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ ./server 4547
Here is the message: 198CE2119
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$

gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ gcc client.c -o client
client.c: In function 'error':
client.c:9:2: warning: implicit declaration of function 'exit' [-Wimplicit-function-declaration]
  9 |     exit(0);
    |     ^~~~~
client.c:9:2: warning: incompatible implicit declaration of built-in function 'exit'
client.c:7:1: note: include <stdlib.h> or provide a declaration of 'exit'
  6 | #include <string.h>
    | ^~~~~
+++ | #include <stdlib.h>
  7 | void error(char *msg){
client.c: In function 'main':
client.c:18:3: warning: incompatible implicit declaration of built-in function 'exit'
  18 |     exit(0);
     |     ^~~~~
client.c:18:3: note: include <stdlib.h> or provide a declaration of 'exit'
client.c:20:11: warning: implicit declaration of function 'atoi' [-Wimplicit-function-declaration]
  20 |     portno = atoi(argv[2]);
     |             ^~~~~
client.c:28:3: warning: incompatible implicit declaration of built-in function 'exit'
  28 |     exit(0);
     |     ^~~~~
client.c:28:3: note: include <stdlib.h> or provide a declaration of 'exit'
client.c:34:22: warning: passing argument 2 of 'connect' from incompatible pointer type [-W incompatible-pointer-type]
  34 |     if (connect(sockfd, &serv_addr, sizeof(serv_addr)) < 0){
     |                      ^~~~~~
     |                      |
     |                      struct sockaddr_in *
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:126:52: note: expected 'const struct sockaddr *' but argument
is of type 'struct sockaddr_in *'
 126 | extern int connect (int __fd, __CONST_SOCKADDR_ARG __addr, socklen_t __len);
     |                      ^
client.c:40:4: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
  40 |     nwrite(sockfd, buffer, strlen(buffer));
     |     ^~~~~
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ ls
client client.c server server.c
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$ ./client localhost 4547
Enter the message: 198CE2119
198CE2119
gaurav1020@DESKTOP-RORPIEK:~/CN/TCP$
```

UDP

CODE-> SERVER

```
#include <stdio.h>
```

```
#include <sys/types.h>
```

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

```
#include <netinet/in.h>
```

```
#include <netdb.h>
```

```
#include <string.h>
```

```
#include <stdlib.h>
```

```
void error(char *msg){
```

```
    perror(msg);
```

```
    exit(0);
```

```
}
```

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

```
    int sock, length, fromlen, n;
```

```
    struct sockaddr_in server;
```

```
    struct sockaddr_in from;
```

```
    char buf[1024];
```

```
    if (argc < 2){
```

```

        fprintf(stderr, "ERROR, no port provided\n");
        exit(0);
    }
    sock=socket(AF_INET, SOCK_DGRAM, 0);
    if (sock < 0){
        error("Opening socket");
    }
    length = sizeof(server);
    bzero(&server,length);
    server.sin_family=AF_INET;
    server.sin_addr.s_addr=INADDR_ANY;
    server.sin_port=htons(atoi(argv[1]));
    if (bind(sock,(struct sockaddr *)&server,length)<0){
        error("binding");
    }
    fromlen = sizeof(struct sockaddr_in);
    while (1){
        n = recvfrom(sock,buf,1024,0,(struct sockaddr *)&from,&fromlen);
        if (n < 0)
        {
            error("recvfrom");
        }
        write(1,"Received a datagram: ",21);
        write(1,buf,n);
        n = sendto(sock,"Got your message\n",17,0,(struct sockaddr *)&from,fromlen);
        if (n < 0){
            error("sendto");
        }
    }
    return 0;
}

```

CODE-> CLIENT

```
#include <stdio.h>

#include <sys/types.h>

#include <sys/socket.h>

#include <netinet/in.h>

#include <netdb.h>

#include <string.h>

#include <stdlib.h>

void error(char *msg){

    perror(msg);

    exit(0);

}

int main(int argc, char *argv[]){

    int sock, length, n;

    struct sockaddr_in server, from;

    struct hostent *hp;

    char buffer[256];

    if (argc != 3){

        printf("Usage: server port\n");

        exit(1);

    }

    sock= socket(AF_INET, SOCK_DGRAM, 0);

    if (sock<0){

        error("ERROR socket");

    }

    server.sin_family=AF_INET;

    hp=gethostbyname(argv[1]);

    if(hp==0){

        error("Unknown host");

    }

    bcopy((char*)hp->h_addr, (char*)&server.sin_addr, hp->h_length);
```

```

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

length=sizeof(struct sockaddr_in);

printf("Please enter the message: ");

bzero(buffer,256);

fgets(buffer,255,stdin);

n=sendto(sock,buffer,strlen(buffer),0,&server,length);

if (n < 0){

    error("ERROR Sendto");

}

n = recvfrom(sock,buffer,256,0,&from, &length);

if (n < 0){

    error("ERROR recvfrom");

}

write(1,"Got an ack: ",12);

write(1,buffer,n);

return 0;

}

```

SCREENSHOTS

```

gaurav1020@DESKTOP-RORPEK: ~/CN/UDP
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ gcc server.c -o server
server.c: In function 'main':
server.c:40:3: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   40 |     write(1,"Received a datagram: ",21);
      |     ^~~~~
      |     fwrite
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ ./server 4547

```

```

gaurav1020@DESKTOP-RORPEK: ~/CN/UDP
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ gcc client.c -o client
client.c: In function 'main':
client.c:36:40: warning: passing argument 5 of 'sendto' from incompatible pointer type [-Wincompatible-pointer-types]
   36 |     n=sendto(sock,buffer,strlen(buffer),0,&server,length);
      |                                ^~~~~~
      |                                |
      |                                struct sockaddr_in *
      |
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:153:44: note: expected 'const struct sockaddr *' but argument
is of type 'struct sockaddr_in **'
   153 |     int __flags, __CONST_SOCKADDR_ARG __addr,
      |                                ^
client.c:40:33: warning: passing argument 5 of 'recvfrom' from incompatible pointer type [-Wincompatible-pointer-types]
   40 |     n = recvfrom(sock,buffer,256,0,&from, &length);
      |                                ^~~~~~
      |                                |
      |                                struct sockaddr_in *
      |
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:164:33: note: expected 'struct sockaddr * restrict' but argument
is of type 'struct sockaddr_in **'
   164 |     int __flags, __SOCKADDR_ARG __addr,
      |                                ^
client.c:44:2: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   44 |     write(1,"Got an ack: ",12);
      |     ^~~~~
      |     fwrite
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-RORPEK:~/CN/UDP$ ./client localhost 4547
Please enter the message:

```



```
gaurav1020@DESKTOP-RORPIEK: ~/CN/UDP
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ gcc server.c -o server
server.c: In function 'main':
server.c:40:3: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   40 |     write(1, "Received a datagram: ", 21);
      |     ^~~~~
      |     fwrite
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ ./server 4547
Received a datagram: 198CE2119

gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ gcc client.c -o client
client.c: In function 'main':
client.c:36:40: warning: passing argument 5 of 'sendto' from incompatible pointer type [-Wincompatible-pointer-types]
   36 |     n=sendto(sock,buffer,strlen(buffer),0,server,length);
      |                                ~~~~~^~~~~
      |                                |
      |                                struct sockaddr_in *
      |
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:153:44: note: expected 'const struct sockaddr *' but argument
is of type 'struct sockaddr_in *'
   153 |     int __flags, __CONST_SOCKADDR_ARG __addr,
      |                                ^
client.c:40:33: warning: passing argument 5 of 'recvfrom' from incompatible pointer type [-Wincompatible-pointer-types]
   40 |     n = recvfrom(sock,buffer,256,0,from,&length);
      |                                ~~~~~^~~~~
      |                                |
      |                                struct sockaddr_in *
      |
In file included from client.c:3:
/usr/include/x86_64-linux-gnu/sys/socket.h:164:33: note: expected 'struct sockaddr * restrict' but argument
is of type 'struct sockaddr_in *'
   164 |     int __flags, __SOCKADDR_ARG __addr,
      |                                ^
client.c:44:2: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
   44 |     write(1, "Got an ack: ", 12);
      |     ^~~~~
      |     fwrite
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ ls
client  client.c  server  server.c
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$ ./client localhost 4547
Please enter the message: 198CE2119
Got an ack: Got your message
gaurav1020@DESKTOP-RORPIEK:~/CN/UDP$
```