

EX5 – DAY TIME SERVER USING UDP

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Server Program:

```
#include <stdio.h>
#include <string.h>
#include <string.h>
#include <stdlib.h>
#include <time.h>
#include <sys/socket.h>
#include <netinet/in.h>
#define PORT 7228

int main(int argc, char **argv){
    time_t cur_time;
    struct sockaddr_in serv_addr, cli_addr;
    int sockfd, n, addrlen;
    sockfd = socket(AF_INET, SOCK_DGRAM, 0);

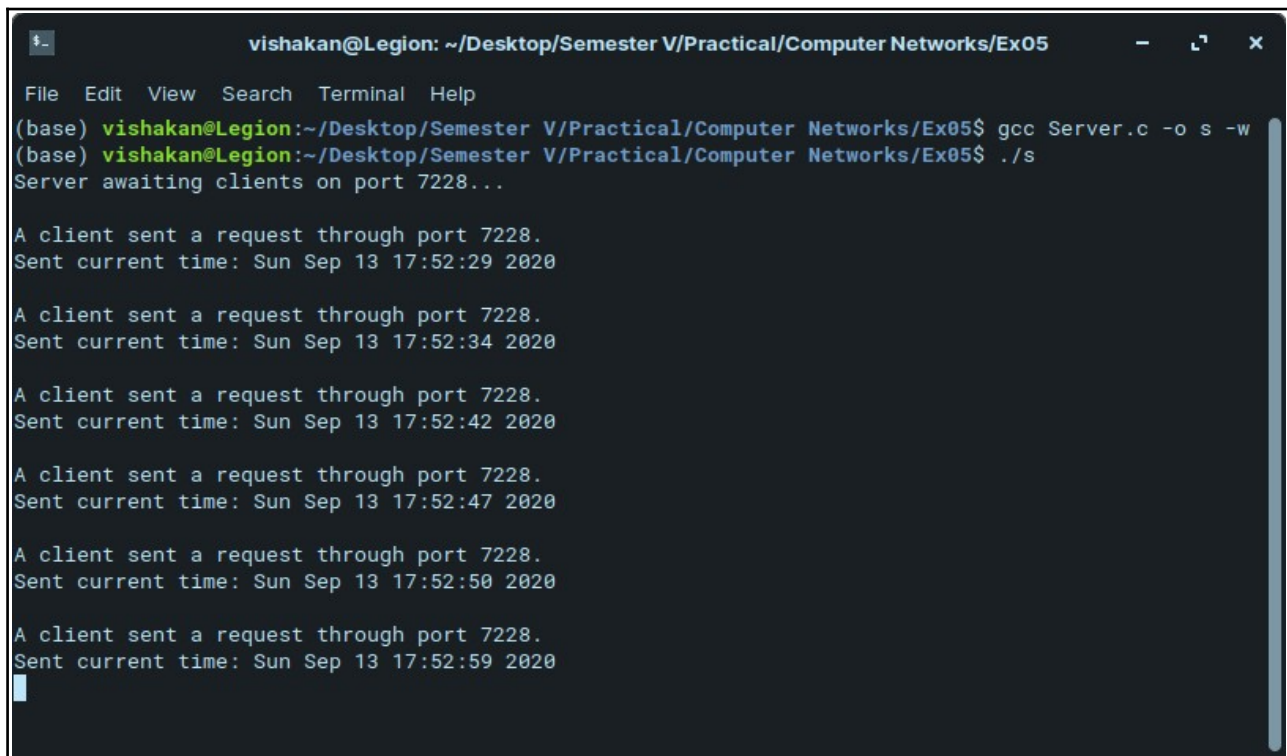
    if(sockfd < 0){
        perror("Error in opening socket.\n");
        exit(1);
    }

    bzero(&serv_addr, sizeof(serv_addr));
    serv_addr.sin_family = AF_INET;
    serv_addr.sin_addr.s_addr = INADDR_ANY;
    serv_addr.sin_port = htons(PORT);

    if(bind(sockfd, (struct sockaddr*)&serv_addr, sizeof(serv_addr)) < 0){
        //Binding the socket to the port with serv_addr
        perror("Bind error occurred.\n");
        exit(1);
    }

    printf("Server awaiting clients on port %d...\n", PORT);
    addrlen = sizeof(cli_addr);
    while(1){ //server is always up
        recvfrom(sockfd, &n, sizeof(n), 0, (struct sockaddr*)&cli_addr, &addrlen);
        cur_time = time(NULL);
        printf("\nA client sent a request through port %d.\n", PORT);
        sendto(sockfd, &cur_time, sizeof(cur_time), 0, (struct sockaddr*)&cli_addr,
            addrlen);
        printf("Sent current time: %s", ctime(&cur_time));
    }
    return 0;
}
```

Output:



```
vishakan@Legion: ~/Desktop/Semester V/Practical/Computer Networks/Ex05
File Edit View Search Terminal Help
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ gcc Server.c -o s -w
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ ./s
Server awaiting clients on port 7228...

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:29 2020

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:34 2020

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:42 2020

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:47 2020

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:50 2020

A client sent a request through port 7228.
Sent current time: Sun Sep 13 17:52:59 2020
```

Client Program:

```
#include <stdio.h>
#include <string.h>
#include <string.h>
#include <stdlib.h>
#include <time.h>
#include <sys/socket.h>
#include <netinet/in.h>

#define PORT 7228

void printOption(time_t cur_time, int opt);

int main(int argc, char **argv){
    time_t cur_time;
    struct sockaddr_in serv_addr, cli_addr;
    int sockfd, n = 1, addrlen, opt, cont;

    sockfd = socket(AF_INET, SOCK_DGRAM, 0);

    if(sockfd < 0){
        perror("Error in opening socket.\n");
        exit(1);
    }

    bzero(&serv_addr, sizeof(serv_addr));
    serv_addr.sin_family = AF_INET;
    serv_addr.sin_addr.s_addr = INADDR_ANY;
    serv_addr.sin_port = htons(PORT);

    addrlen = sizeof(serv_addr);

    while(1){
        printf("\nRequest to Server:\n\t1 - Date\n\t2 - Day\n\t3 - Month\n\t4 - Year\n\t5 - Time\n\t6 - Toronto Time\nYour Option -> ");

        scanf("%d", &opt);
        printf("Requesting information to server via port %d.\n\n", PORT);
        sendto(sockfd, &n, sizeof(n), 0, (struct sockaddr*)&serv_addr, sizeof(serv_addr));

        recvfrom(sockfd, &cur_time, sizeof(cur_time), 0, (struct sockaddr*)&serv_addr, &addrlen);

        printOption(cur_time, opt);
        printf("\nDo you wish to continue? (0/1) -> ");
        scanf("%d", &cont);
    }
}
```

```

        if(cont == 0){
            break;
        }
    }
}

```

close(sockfd); //close client sockfd once requests are over.

```

return 0;
}

```

```

void printOption(time_t cur_time, int opt){
    struct tm *temp;
    time_t toronto_time;
    char time_buffer[1000];

    temp = localtime(&cur_time);

    switch(opt){
        case 1:
            strftime(time_buffer, sizeof(time_buffer), "%X", temp);
            printf("Date: %s\n", time_buffer);
            break;

        case 2:
            strftime(time_buffer, sizeof(time_buffer), "%A", temp);
            printf("Day of Week\t:\t%s\n", time_buffer);
            strftime(time_buffer, sizeof(time_buffer), "%d", temp);
            printf("Day of Month\t:\t%s\n", time_buffer);
            bzero(&time_buffer, sizeof(time_buffer));
            strftime(time_buffer, sizeof(time_buffer), "%j", temp);
            printf("Day of Year\t:\t%s\n", time_buffer);
            break;

        case 3:
            strftime(time_buffer, sizeof(time_buffer), "%B", temp);
            printf("Month\t:\t%s\n", time_buffer);
            break;

        case 4:
            printf("Year\t:\t%d\n", (temp->tm_year + 1900)); //tm_year stores
                                                    years elapsed since Unix epoch
            break;

        case 5:
            strftime(time_buffer, sizeof(time_buffer), "%I:%M%p", temp);
            printf("Time\t:\t%s\n", time_buffer);
            break;
    }
}

```

case 6:

```
    strftime(time_buffer, sizeof(time_buffer), "%c", temp);  
    printf("Local Time\t:\t%s\n", time_buffer);  
    bzero(&time_buffer, sizeof(time_buffer));  
    temp = gmtime(&cur_time); //GMT  
    temp->tm_hour -= 5; //Toronto is -5H ahead of GMT  
    //temp->tm_min -= 30;  
    toronto_time = mktime(temp); //Converting the date & time  
                                appropriately  
    temp = localtime(&toronto_time);  
    strftime(time_buffer, sizeof(time_buffer), "%c", temp);  
    printf("Toronto Time\t:\t%s\n", time_buffer);  
    break;
```

default:

```
    printf("\n\tInvalid option.\n");  
    break;
```

}

}

Output:

```
vishakan@Legion: ~/Desktop/Semester V/Practical/Computer Networks/Ex05
File Edit View Search Terminal Help
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ gcc Client.c -o c -w
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ ./c

Request to Server:
  1 - Date
  2 - Day
  3 - Month
  4 - Year
  5 - Time
  6 - Toronto Time
Your Option -> 2
Requesting information to server via port 7228.

Day of Week      :      Sunday
Day of Month     :      13
Day of Year      :      257

Do you wish to continue? (0/1) -> 1

Request to Server:
  1 - Date
  2 - Day
  3 - Month
  4 - Year
  5 - Time
  6 - Toronto Time
Your Option -> 4
Requesting information to server via port 7228.

Year      :      2020

Do you wish to continue? (0/1) -> 1

Request to Server:
  1 - Date
  2 - Day
  3 - Month
  4 - Year
  5 - Time
  6 - Toronto Time
Your Option -> 6
Requesting information to server via port 7228.

Local Time      :      Sun Sep 13 17:52:59 2020
Toronto Time    :      Sun Sep 13 07:22:59 2020

Do you wish to continue? (0/1) -> 0
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$
```

```
vishakan@Legion: ~/Desktop/Semester V/Practical/Computer Networks/Ex05
File Edit View Search Terminal Help
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ gcc Client.c -o c -w
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$ ./c

Request to Server:
1 - Date
2 - Day
3 - Month
4 - Year
5 - Time
6 - Toronto Time
Your Option -> 1
Requesting information to server via port 7228.

Date: 09/13/20

Do you wish to continue? (0/1) -> 1

Request to Server:
1 - Date
2 - Day
3 - Month
4 - Year
5 - Time
6 - Toronto Time
Your Option -> 3
Requesting information to server via port 7228.

Month : September

Do you wish to continue? (0/1) -> 1

Request to Server:
1 - Date
2 - Day
3 - Month
4 - Year
5 - Time
6 - Toronto Time
Your Option -> 5
Requesting information to server via port 7228.

Time : 05:52PM

Do you wish to continue? (0/1) -> 0
(base) vishakan@Legion:~/Desktop/Semester V/Practical/Computer Networks/Ex05$
```