Question 1

Producer

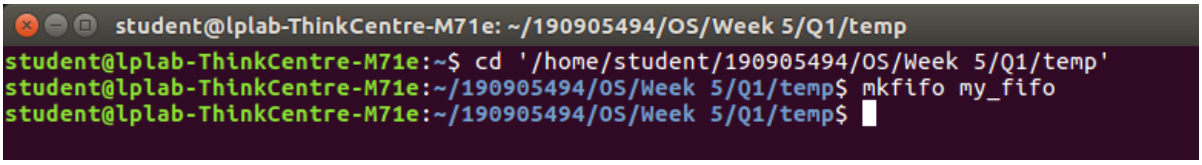
```
/*
Write a producer and consumer program in C using the FIFO queue.
The producer should write a set of 4 integers into the FIFO queue
and the consumer should display the 4 integers.
*/


#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<limits.h>
#include<fcntl.h>
#include<sys/msg.h>
#include<sys/stat.h>
#include<string.h>

#define FIFO_NAME "my_fifo"
#define BUFFER_SIZE 1000


int main(int argc, char *argv[])
{
   int pipe_fd;
   int res;
   int open_mode=O_WRONLY;
   int n=0;
   char buffer[BUFFER_SIZE+1];

   if(access(FIFO_NAME,F_OK)==-1)
   {
      res=mkfifo(FIFO_NAME,0777);
      if(res!=0)
      {
         fprintf(stderr, "Could not create file%s\n",FIFO_NAME );
         exit(EXIT_FAILURE);
      }
   }

   printf("Process %d opening FIFO O_WRONLY\n",getpid());
   pipe_fd=open(FIFO_NAME,open_mode);
   printf("Process %d result %d\n",getpid(),pipe_fd);

   if (pipe_fd!=-1)
   {
      printf("Enter 4 numbers\n");
```

```
        while(n<4)
        {
            scanf("%s",buffer);
            res=write(pipe_fd,buffer,BUFFER_SIZE);

            if(res==-1)
            {
                fprintf(stderr, "Write Error on Pipe\n");
                exit(EXIT_FAILURE);
            }
            n++;
        }
        (void)close(pipe_fd);
    }
    else
        exit(EXIT_FAILURE);

    printf("Process %d Finished\n",getpid() );
    exit(EXIT_SUCCESS);

}
```

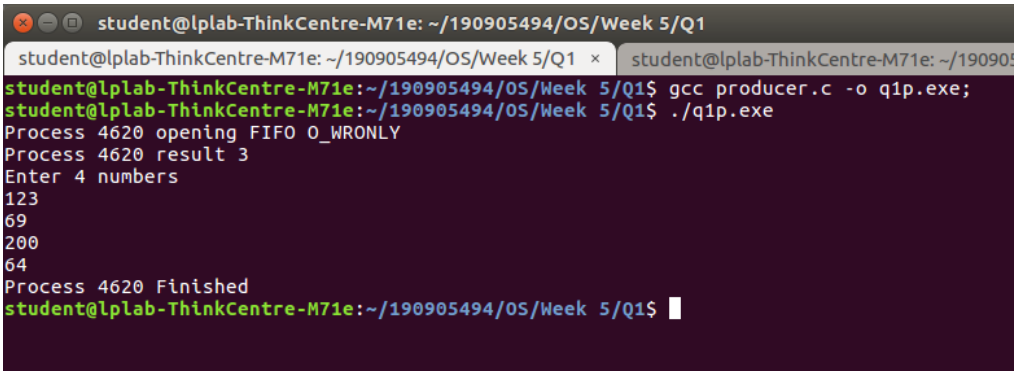
Consumer

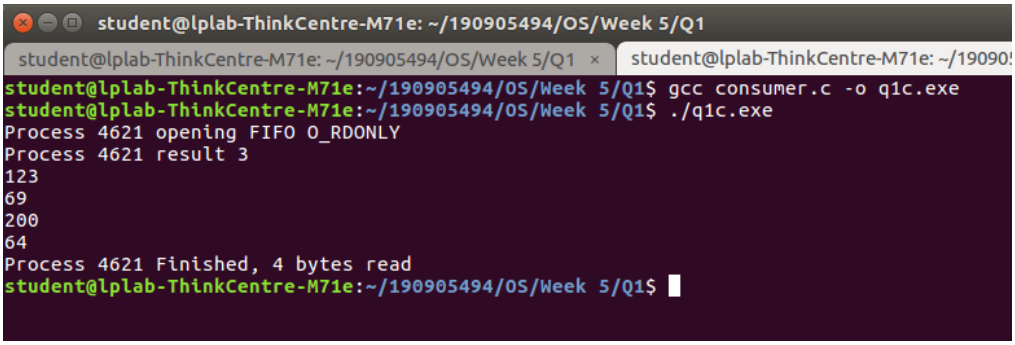
```
/*
Write a producer and consumer program in C using the FIFO queue.
The producer should write a set of 4 integers into the FIFO queue
and the consumer should display the 4 integers.
*/

#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<limits.h>
#include<fcntl.h>
#include<sys/msg.h>
#include<sys/stat.h>
#include<string.h>

#define FIFO_NAME "my_fifo"
#define BUFFER_SIZE 1000

int main(int argc, char *argv[])
{
    int pipe_fd;
    int res;
    int open_mode=O_RDONLY;
    int n=0;
    char buffer[BUFFER_SIZE+1];
    memset(buffer,'\0',sizeof(buffer));
```

```
    printf("Process %d opening FIFO O_RDONLY\n",getpid());
    pipe_fd=open(FIFO_NAME,open_mode);
    printf("Process %d result %d\n",getpid(),pipe_fd);

    if (pipe_fd!=-1)
    {
        do
        {
            res=read(pipe_fd,buffer,BUFFER_SIZE);
            printf("%s\n",buffer );
            n++;
        }while(n<4);

        (void)close(pipe_fd);
    }

    else
        exit(EXIT_FAILURE);

    printf("Process %d Finished, %d bytes read\n",getpid(),n );
    exit(EXIT_SUCCESS);
}
```



Creating FIFO Pipe

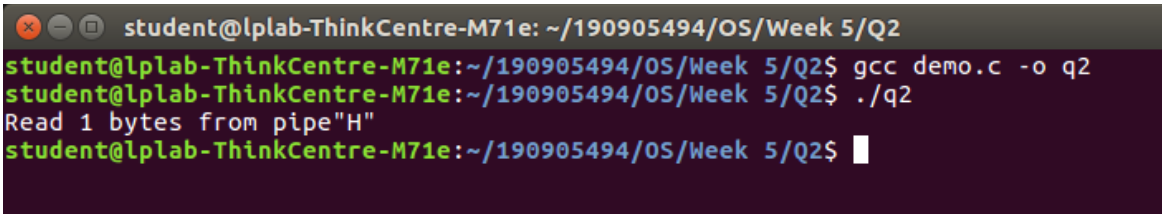




Question 2

// Demonstrate creation, writing to, and reading from a pipe.

```
#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/ipc.h>
#include<sys/msg.h>
#include<string.h>

int main(int argc, char *argv[])
{
   int n, i=0;
   int fd[2];
   char buf[1025];
   char *data = "Hello How Are You";

   // creating
   pipe(fd);

   // Writing
   while(i<strlen(data)){
      write(fd[1],data,strlen(data));
      i++;
   }

   // reading
   i=0;
   while(i<strlen(data)){
      if(n=read(fd[0],buf,1024)>=0)
      {
         buf[n]='\0';
         printf("Read %d bytes from pipe\"%s\"\n",n,buf);
      } else
         perror("Read");
      exit(0);
      i++;
   }
}
```



Question 3

Parent

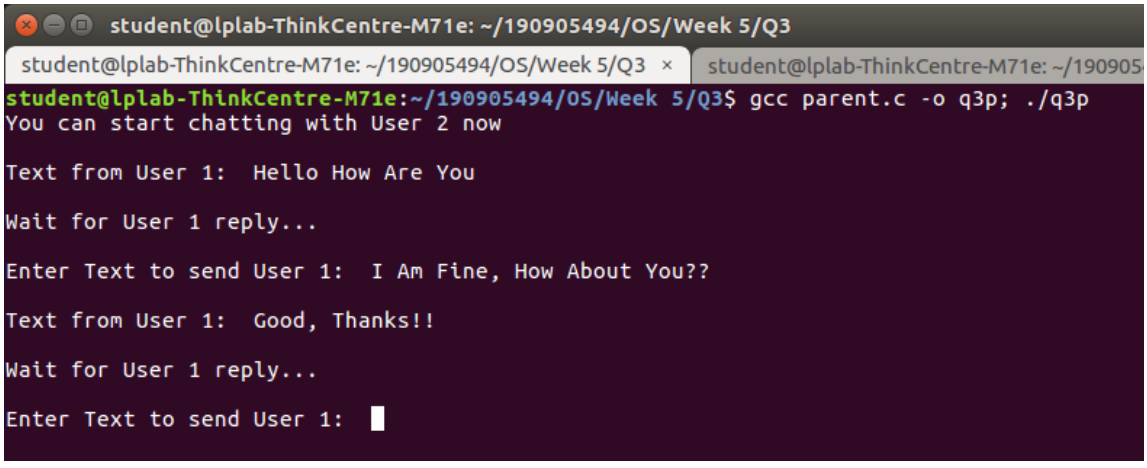
```
/*
Write a C program to implement one side of FIFO.
*/

#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<limits.h>
#include<fcntl.h>
#include<sys/msg.h>
#include<sys/stat.h>
#include<string.h>


#define FIFO_NAME "my_fifo"
#define BUFFER_SIZE 10000


int main(int argc, char *argv[])
{
   int pipe_fd;
   int res;
   int open_mode1=O_WRONLY;
   int open_mode2=O_RDONLY;
   int n=0;
   char buffer[BUFFER_SIZE+1];

   if(access(FIFO_NAME,F_OK)==-1)
   {
      res=mkfifo(FIFO_NAME,0777);

      if(res!=0)
      {
         fprintf(stderr, "Could not create file%s\n",FIFO_NAME);
         exit(EXIT_FAILURE);
      }
   }

   printf("You can start chatting with User 2 now\n");

   while(1)
   {
      pipe_fd=open(FIFO_NAME,open_mode2);

      printf("\nText from User 1:  ");
      res=read(pipe_fd,buffer,BUFFER_SIZE);
      printf("%s\n",buffer );
```

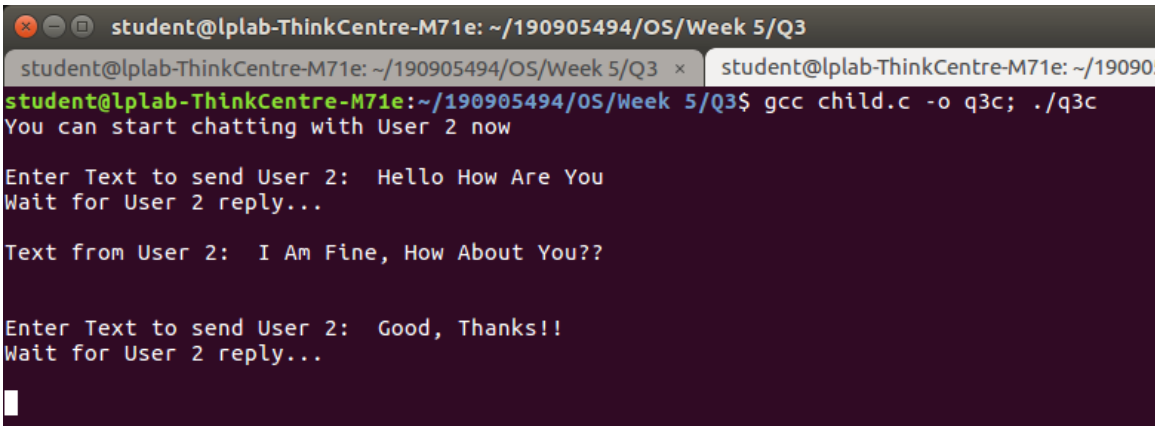
```
        close(pipe_fd);

        printf("Wait for User 1 reply...\n");
        pipe_fd=open(FIFO_NAME,open_mode1);

        printf("\nEnter Text to send User 1:  ");
        fgets(buffer,BUFFER_SIZE,stdin);
        res=write(pipe_fd,buffer,BUFFER_SIZE);

        close(pipe_fd);


    }

    (void)close(pipe_fd);


    printf("Process %d Finished\n",getpid());
    exit(EXIT_SUCCESS);
}
```

Child

```
/*
Write a C program to implement one side of FIFO.
*/

#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<limits.h>
#include<fcntl.h>
#include<sys/msg.h>
#include<sys/stat.h>
#include<string.h>


#define FIFO_NAME "my_fifo"
#define BUFFER_SIZE 10000


int main(int argc, char *argv[])
{
    int pipe_fd;
    int res;
    int open_mode1=O_WRONLY;
    int open_mode2=O_RDONLY;
    int n=0;
    char buffer[BUFFER_SIZE+1];

    if(access(FIFO_NAME,F_OK)==-1)
```

```
    {
       res=mkfifo(FIFO_NAME,0777);

       if(res!=0)
       {
          fprintf(stderr, "Could not create file%s\n",FIFO_NAME);
          exit(EXIT_FAILURE);
       }
    }

    printf("You can start chatting with User 2 now\n");

    while(1)
    {
       pipe_fd=open(FIFO_NAME,open_mode1);

       printf("\nEnter Text to send User 2:  ");
       fgets(buffer,BUFFER_SIZE,stdin);
       res=write(pipe_fd,buffer,BUFFER_SIZE);

       close(pipe_fd);

       printf("Wait for User 2 reply...\n");
       pipe_fd=open(FIFO_NAME,open_mode2);

       printf("\nText from User 2:  ");
       res=read(pipe_fd,buffer,BUFFER_SIZE);
       printf("%s\n",buffer );
       close(pipe_fd);

    }


    (void) close(pipe_fd);


    printf("Process %d Finished\n",getpid());
    exit(EXIT_SUCCESS);
}
```





Question 4

```
/*
Write a C program reading and writing a binary file in C.
*/

#include<stdio.h>
#include<stdlib.h>

int main()
{

   FILE* fptr;
   int num=0;
   fptr=fopen("demo.bin","wb+");

   printf("Enter some numbers : \n");

   for(int i=0;i<4;i++)
   {

      scanf("%d",&num);
      fwrite(&num,sizeof(int),1,fptr);
   }

   printf("Writing done!\n");
   fclose(fptr);

   fptr=fopen("demo.bin","rb");

   for(int i=0;i<4;i++)
   {

      fread(&num,sizeof(int),1,fptr);
      printf("%d\n",num);
   }

}
```

```
student@lplab-ThinkCentre-M71e: ~/190905494/OS/Week 5/Q4
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 5/Q4$ gcc bin.c -o q4; ./q4
Enter some numbers :
10
20
30
40
Writing done!
10
20
30
40
student@lplab-ThinkCentre-M71e:~/190905494/OS/Week 5/Q4$
```

‘demo.bin’ file created to read and write from