Military Institute of Science and Technology

CSE-308

Operating System Sessional

Report on Creating Operating System

Group – 06

Group Members:

1.   **Ashiqur Rahman – 201614044**

2.   **Abdullah Al Osman – 201614049**

3.   **Akash Poddar - 201614051**

Project Name:

Make an operating system that checks whether any given number is prime or not and finds out area of some geometric shapes.

Objectives:

The main objectives of this project are:

i.   To learn about how to make an operating system from the scratch
ii.   To learn about writing assembly and C files that are needed to make the operating system.
iii.   To learn about implementing common functions present in the stdio.h library by ourselves.
iv.   To learn about various patterns.
v.   To get an overview conception about a very basic operating system

Functionalities:

The main functionalities of this project are:

i.   Check whether any number is prime or not
ii.   Taking multi-digit numbers as input and using them
iii.   Finds the area of geometric shapes like rectangle, triangle, square
iv.   Displays the area in numeric form.

Required Software for Host Environment Setup:

i.   **Xorriso:** It is needed for creating an iso image of the operating system so that we can boot it in other devices or systems.
ii.   **Grub:** It is needed so that we can view our operating system.
iii.   **Gcc:** This is the C compiler which is needed to compile our C codes.
iv.   **Nasm:** This is an assembler which is needed to assemble our assembly codes.
v.   **Virtual Box:** This is needed to see if the operating system can run on a virtual machine by using the iso image we generated by using Xorriso.
vi.   **Qemu-system-i386:** This is needed to show our operating system and do line by line execution so that we can easily detect errors and problems in our operating system and solve them properly.

Execution Flow:

The project has files named kernel.asm, kernel.c, link.ld, build.sh, etc.

The execution of the project starts from the kernel.asm file since it is specified by the link.ld file that the entry point of the operating system will be the 'start' function present in the kernel.asm file.

From the kernel.asm, the execution will move to the kernel.c file as the function kmain() present in the kernel.c file will be called from the kernel.asm file.

From the kernel.c file, the required functionalities will be done and finally the execution will come to a halt.

We ran the following commands:

nasm -f elf32 kernel.asm -o kasm.o

gcc -m32 -c kernel.c -o kc.o

ld -m elf_i386 -T link.ld -o os/boot/kernel.bin kasm.o kc.o

qemu-system-i386 -kernel os/boot/kernel.bin

grub-mkrescue -o myos.iso os/

To do all these things, we compiled the kernel.asm file via nasm and kernel.c file via gcc compiler. After that we linked the object files generated from the kernel.asm and kernel.c files to produce a kernel.bin file In the directory specified by os/boot. After that we used qemu to run the kernel.in file present in os/boot directory to view the operating system. After that we generated the iso image of the operating system so that we could use it on a virtualbox machine.

Demo:

```
OS (0)> prime
Enter any Integer: 2
It is a prime
OS (0)> prime
Enter any Integer: 4
It is not a prime
OS (0)> ractangle area
Enter length of ractangle: 4
Enter width of ractangle: 5
Area of ractangle: 20
sOS (0)>_
```

Discussion:

This project aims at knowing about creating an operating system from the very basic level.
From this project we learnt how to link assembly and C code to form binary file of the operating system.
We also learnt how to make an iso file for an operating system.

For making operating system we need different types of tools and we know about all those tools from this project. Those tools are xorriso, grub, gcc, nasm, virtualbox, qemu-system-i386.

Xorriso and grub help us to create boot loader and iso file for operating system, gcc run c code, nasm run assembly code,qemu-system-i386 helps to run the operating system without installing in the virtualbox.

During creating an operating system we face some difficulties like we were a little bit confused how to create an operating system. For solving those confusion we took help from google, teachers, and different types of tutorial related operating system and discuss among ourselves.