Computer Systems Exam, 4201COMP Charlie McKnight ID:942559

1. I. b

II. a

III. a

IV. a

V. c

VI. d

VII. c

VIII. a

IX. c

X. d

XI. a

XII. a

XIII. a

XIV. c

XV. b

1.2. I. (141)10 > 141/2 = 70, r1

70/2 = 35, 0

35/2 = 17, r1

17/2 = 8, r1

8/2 = 4, r1

4/2 = 2, 0

2/2 = 1, 0

1/2 = 0, r1

= (10001101)2

II. (111001)2 > 1 + 8 + 16 + 32 = (57)10

III. (255)10 > 255/16 = 15, r15, = F

15/16 = 0, r15, =F

=(FF)16

IV. (C53)16 > C = 12 = 1100

5 = 0101

3= 0011

= (110001010011)2

V. (FE7)16 > F = 1111

E = 1110

7 = 0111

=111111100111 > 1 + 2 + 4 + 32 + 64 + 128 + 256 + 512 + 1024 + 2048

= (4071)10

2.1.

A Kernel Operating system is an operating system that takes control over the whole system, therefore making it the most important part. On start-up, the Kernel is the first program loaded and it will remain in the memory till the system is shut down. It undertakes the low-level tasks and provides the user and interface between them and the systems hardware. It allocates memory to running programs, and then will free memory space when the program is closed, and the memory is no longer required. It does this by creating processes and threads which will in turn allocate memory and execute individual process. All memory management is therefore done by the kernel. The Kernel is used to share resources between various process to make sure each process has uniform access the systems resources. When a problem occurs on a component of the hardware, it is up to the kernel to deal with the problem. The kernel also manages plug and play in windows.

2.2

A process is something currently being executed in the operating system. Every process has a unique ID used to identify it from the other processes. Each process will be in its own state at a particular time. The first state is a new state which is the state a process will go into after it has been created. From here the process will move to a ready state, which means that the process is ready to be executed by the CPU but hasn’t been yet. More than one process can be in the ready state at the one time. Once the CPU choses which process to execute, this process will be put in a running state. During the execution the process might be forced into a waiting state due to other process needing to be executed beforehand. Once the process has been fully executed it will be placed in a terminated state and the process is deleted.

2.3

The boot sequence is the order the computer searches for non-volatile data storage devices that contain code for the program to load up the operating system. Once this code is found then the CPU executes the code and loads the operating system into the system memory. Another term used for boot sequence is the BIOS boot order. The first step for the computer is to load the Basic Input Output System, or the BIOS, which allows the computer to accept user input and show information on the monitor. The second step is the power on self-test or the POST, which is the first test the computer performs when it is turned on. This is also known as the POST. This is the initial diagnostics performed by the computer when first switched on. If any problem arises during this step, then the ser will be given an error message. Now it is time for the operating system to be loaded, therefore the kernel will be loaded up by the BIOS. Other system utilities are then loaded up such as any antivirus software on the computer, or the file management system.

2.4.

The context switch is the process that stores the state of process so that it can be restored for later execution allowing multiple processes to be shared within the CPU.

3.1

A virtual circuit is a way for data to be sent over a network that will make it seem as though there is a physical link between the destination and its original source. A logical connection must be made between the two before any data is sent or received. There is no real direct path, and the packets that are transmitted will share links with unrelated packets of data. Packets from the same connection are transferred and received in the correct order since they have all travelled in the same route. The connection is more reliable as even during times were there is lots of traffic, packets will get through if a connection has been made.

3.2

Wireless channels are less reliable than wired channels, due to the fact there is more interference as it is done through an open space, making it less secure. There are also higher chances of delays and errors because of retransmissions, and also the varying conditions of mobility. Wired channels are often more secure, making them more robust as it will mean more security is needed for wireless channels as physical security is harder due to the fact it isn’t as easy to limit transmissions to a building.

3.3

Point-to-point channels are channels in which there is only one receiver that will be able to receive a message as the channel is between 2 fixed points, even when there are multiple receivers waiting to receive the message. An example of a point-to-point channel is a phone call. Point-to-point channels are very fast compared to other channels as you only need access to 2 separate nodes. It is made by a simple connection and is easy to run. However a disadvantage of using point-to-point is if one of the nodes stops working then no data is able to be transferred across the network.

3.4

Compiled language is a programming language that is mainly used to implement translators which are used to convert machine code to source code. Examples of compiled languages include C, and C++. These languages will produce files that are more efficient, which is useful for computer games to be run on these languages. On the other hand interpreter programming languages are those which execute instructions that haven’t previously been compiled into machine language. Examples of executable files are JavaScript, and PHP. These languages are useful as they will tell you where errors are but run a bit slower than compiled languages.

4.1

4.2 i.

Shortest Job First:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | C | C | B | B | D | D | D |

First Come First Served:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | B | B | C | C | D | D | D |

Round Robin:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | C | B | D | C | B | D | D |

Modified Round Robin:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | C | C | B | D | B | D | D |

ii. (SJF) = 1 + 3 + 5 + 8 = 17 / 4 = 4.25

(FCFS) = 1 + 3 + 5 + 8 = 17 / 4 = 4.25

(RR) = 1 + 5 + 6 + 8 = 20 / 4 = 5

(MRR) = 1 + 3 + 6 + 8 = 18 / 4 = 4.5

iii. (SJF) = 0 + 1 + 3 + 5 = 9 / 4 = 2.25

(FCFS) = 0 + 1 + 3 + 5 = 9 / 4 = 2.25

(RR) = 0 + 1 + 2 + 3 = 6 / 4 = 1.5

(MRR) = 0 + 1 + 3 + 4 = 8 / 4 = 2