Hello Calum, I have left specific comments on your TMA below, all of which are highlighted in blue. I have also left overall comments and feedback on your PT3 form.

**Question 1.a)**

1. Daemons are programs that can run in the background without the user needing to control them. A daemon's task is to collect requests and distribute them to other programs.
2. The main idea behind a microkernel is that it uses the smallest number methods to run an operating system. They are also more user friendly when it comes to keep checks on them.
3. A benefit is that it’s harder for passwords to be cracked, it’s done by adding salt-strings to passwords which allow data to be added and the passwords can be kept safer.
4. It is not used because the processes are received over a longer period of time.   
   Not sure what you mean by this – this is about the problems associated with allocating space to a hard disk…
5. An advantage of bash scripting that it minimises the overall amount the user needs to interact with the commands, as most of the scripting is automatic. A second advantage is that it can be cheaper.

8 marks

**Question 1.b)**

In a race condition, multiple threads execute in a critical section in different orders, resulting in a different result afterward. This may occur if the threads execute in the critical section in different orders. Semaphores in operating systems are used to prevent critical sections. The use of locks or atomic variables can prevent race conditions when threads are synchronized. 5 marks

**Question 1.c)**

A problem with FIFO (first in, first out) is that using the processor for an extended period could prevent other processes from progressing. Due to Round-robin scheduling, more important tasks do not receive special priority. An issue with Priority is that smaller numbers are more important in some systems, while in others, smaller numbers are lower priorities.

3 marks

**Question 1.d)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| FIFO:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | B | B | B | B | C | C | D | D | D |   For FIFO, the only order is which ever came first, so for this it would be as shown above. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Round Robin:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | B | C | D | B | C | D | B | D | B |   For Round Robin, the order is created by queues running in rotations. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Priority:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | D | D | D | C | C | B | B | B | B | A |   For Priority, the order is created by queues running in rotations. |

Almost, for priority it should be DDD BBBB CC A

10 marks

**Question 2.a)**

A way to approach the command line without knowing the commands is to input ‘help’ into the command line. This then shows all the individual commands that can be used.

Graphical user interface, text

Description automatically generated

There are other options also, like man and even the Internet.

2 marks

**Question 2.b)**

Text

Description automatically generated

Also needed --*uid 1234*

2 marks

**Question 2.c)**

Graphical user interface, application

Description automatically generated

6 marks

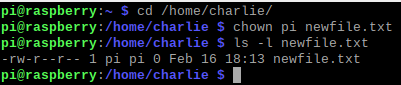
**Question 2.d)**

Text

Description automatically generated

2 marks

**Question 2.e)**



6 marks

**Question 2.f)**



Text

Description automatically generated

Also needed to see redirect and grep

2 marks

**Question 3.a)**

To create a very secure online environment, I chose Linux Kodachi as my first Linux distribution. In addition to privacy and security settings, it offers many built-in advanced tools so you can start using them right away. Data stored on Kodachi systems can be completely destroyed by pressing the self-destruct button. The system protects you while you work, but also hides your tracks afterwards. When you shut down your system, you leave behind all traces of any session you had on the host.

for my second Linux distribution I have chosen Qubes, because it's very similar to Linux Kodachi in terms of security and privacy. a similar feature in Qubes is that it allows you also destroy any data that you wish to remove, much like Kodachi. It's very easy to obtain and download on a desktop so you can use it remotely wherever you please. If you don't want to use a virtual machine for it, you can download it straight to the USB and then plug into your PC or laptop to start using it so overall it's very accessible.

Lastly for my third Linux distribution I have chosen Kali Linux, with Kali Linux it has been made so that your life is easier whilst also being accessible. Kali Linux can be downloaded on phones, desktops, and PC’s. The overall look of Kali Linux is my personal favourite as it looks very seamless and user friendly, also it's very customisable. If you wish to keep something hidden or if you want to be sneaky, there is a “kali Undercover“ mode which you can use to hide yourself.

So, from out of these three distributions Kali, Kodachi and Qubes. The one that I would most likely use myself is Kali Linux. I love how accessible it is so, I could use it on my phone. A reason why I prefer Kali Linux over Kodachi, and Qubes is that is more customisable, and you can change different aspects of how it looks but at the same time it also keeps you protected.

Good - 11 marks

**Question 3.b)**

My first method of testing Kali Linux distribution is through a virtual machine, by using a VM there is no need for physical hardware such as using a USB that could be easily lost and so I then need to purchase a new USB and download another copy of Kali Linux onto it. One drawback is that it’s located and stored in a single location, so if I were to accidentally delete a file it's going to have a chain effect meaning that Kali Linux wouldn't operate.

A second method would be through a USB, one benefit is that there is no loss in speeds when using a USB as the transfer rates are almost instant. One drawback would be how long the USB is going to last, it may become damaged overtime therefore not work to its full potential.

These are two good options, but you needed a little more description on what VM and USB disk actually is.

10 marks

Links for questions a+b:

Control Engineering. Available at: <https://www.controleng.com/articles/the-pros-and-cons-of-using-a-virtualized-machine/> (Accessed 16 February 2022).

hitechwhizz. Available at: <https://www.hitechwhizz.com/2020/10/7-advantages-and-disadvantages-drawbacks-benefits-of-usb-flash-drive.html> (Accessed 16 February 2022).

Qubes. Available at: [https://www.qubes-os.org/](https://www.qubes-os.org/%20) (Accessed 16 February 2022).

Kali. Available at: <https://www.kali.org/> (Accessed 16 February 2022).

Distrowatch. Available at: <https://distrowatch.com/table.php?distribution=kodachi> (Accessed 16 February 2022).

**Question 4.a)**

ePortfolio Week 4 Activity 10 – Evidence

Text

Description automatically generated

Enter python3 bank.py –help, this is displayed.

Text, chat or text message

Description automatically generatedEnter python3 bank.py -l, a list of deposits and withdrawals are displayed

Graphical user interface, text

Description automatically generatedEnter python3 bank.py (with no options), shows an error after two transactions.

Explore the effect of changing the time each transaction takes,

Text

Description automatically generatedText

Description automatically generated

If the time is lowered, zero discrepancies are detected. Whereas if you increase the time, more discepancies are dectected. Although both have the same output were the final balance equals zero.

ePortfolio Week 1 Activity 10 – Evidence

For this I will say no, for now. However, if I didn’t need to use a virtual machine for it then I would happily use it on a day to day basis. Aswell I’ve looked at physical Rasberry PI’s just because of this course, it would be handy to have and experiment with. Plus they’re not too expensive, meaning that they’re more accessible which I like. On the other hand, I’m still going to stay with windows just because I’m used to it and currently it’s installed on my desktop.

**Question 4.b)**

Across all the ePortfolio activities I found the whole virtual machine aspect of it quite interesting, before taking this university course I didn't know virtual machines were even a thing or that you could use more than one different machine on a laptop. A challenge across ePortfolio week four activity ten, was making sure I done it correctly, it did feel a bit complicated when trying to figure out what to do. Throughout the operating system module I've only had one problem which was when my first Raspberry Pi in the virtual machine wouldn't load but I managed find a way around that from the help of useful videos and in the forum. For ePortfolio week one activity ten, I think I might change my mind on whether or not I stay with windows because there are better alternatives that are just as good or better, so I might try a different one out for a period of time and see how that is. Everything in the operating systems module is new to me and I enjoyed learning about Raspberry Pi what sort of stuff you can do on it. My technical skills have increased with the virtual machines on learning how to use them correctly and that I've learned a lot about the command line interface.

Very good - 8 marks