BSc. Cybersecurity
200 Level

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CYB 202 - Systems and Network Administration

Part A: Systems Administration – Definitions

A Systems Administrators (SA) is an experts who ensures that all software and hardware systems functions properly to achieve organisation's goals. SAs deal physical computer servers, other hardware and software infrastructure. They provide support to users that need to access IT resources within the organisation's ICT infrastructure. The Specific Duties of a System Administrator are outlined thus:

Systems Administration – Duties

i. User Accounts Management: User IDs, emails, group membership, permissions and restrictions, communicating policies and procedures, disabling/removing users
ii. Hardware Management: Capacity planning, inventory, hardware evaluation and purchase, device driver installation, systems configurations and settings, user notifications and documentation.
iii. Data Backups: Disk and backup media planning, disaster recovery (onsite/offsite, periodic testing, multiple copies, user communications/assurance (restore guarantees and procedures, loss tolerance).
iv. Software Installation/Maintenance: Evaluation of software, download and building, installation, maintenance of multiple versions, security, patches and updates, user notification and documentation

Systems Administration – Duties – Cont'd

v. System Monitoring: hardware and services, capacity (RAM, Disk, CPU, network), security (passwords, break-ins), systems logs.
vi. Troubleshooting: problem discovery, diagnosis and resolution.
vii. Local documentation: **administrative policies and procedures** (backup media locations, hardware description, configuration, connections and location, software – install location/media, installation and configuration details, patches and update installed); **Acceptable use policies**
viii. Security concerns: systems login and audit, unexpected/unauthorised use detection, monitoring of security advisories.
ix. User assistance: help desks, trouble-ticket systems, systems (hardware/software availability), etc.

Network Administration – definition

Network administrators (NA) is an ICT expert who's role is to build computer networks and ensure continuous connectivity and availability of the networks. An NA focuses setting up network equipment and ensuring that their network infrastructure can support user activities within the organisation. They also monitor overall activity and demands on the network, identify vulnerabilities, threats and strange traffic on the network.

Network Administration – Duties

i. Network design – planning the implementation of the network infrastructure.

ii. Research and select and order network hardware – E.g network cables, routers, switches, etc based on requirements with respect to the design

iii. Configuring/installing and testing network equipment – Linking the physical network devices and logically connecting them to be able to communicate.

iv. Troubleshooting and Maintenance of network infrastructure- diagnosing problems, establishing the root cause(s) and resolving them.

v. Monitoring Network activities – Observing user activities and network loads to proactively identify and resolve potential problems that may result

vi. Setting up firewalls – set up fire walls to secure the network from unauthorised traffic and users.

vii. Respond to and fix network outages- when users report network downtimes, NAs ensure resolution.

System Administration Tools

For systems administrators to perform their functions, they require a set of tools built into the operating system upon which their system run. E.g, Linux/Unix, windows. etc. Here we review some administrative tools for windows.

Assignment
Access the windows administrative tools for your version of windows from the control panel and explain the application of each of these tools.

To be submitted via email

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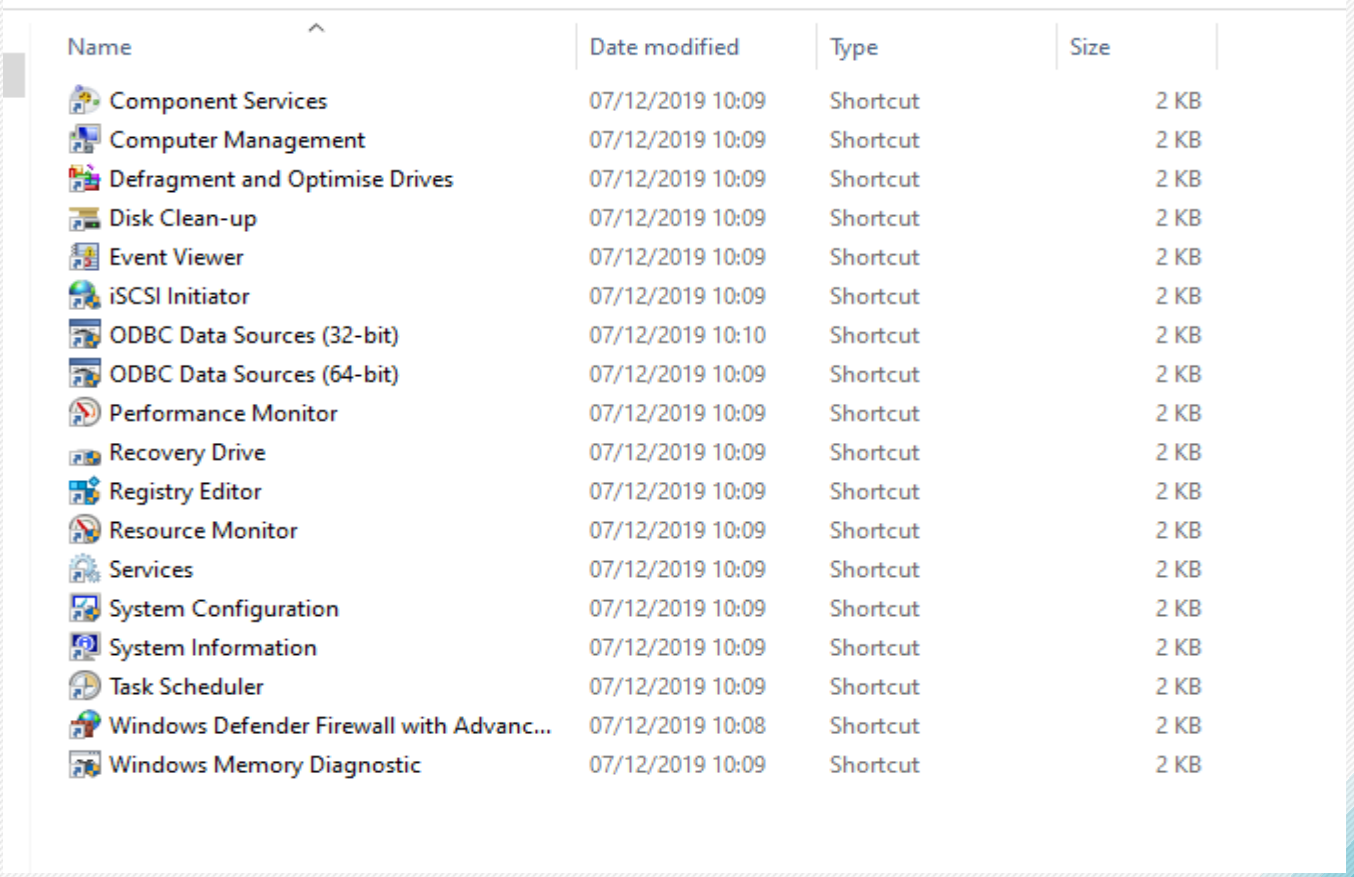
Submission is on Monday, 23rd May, 2022



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Defragment and Optimise Drives	07/12/2019 10:09	Shortcut	2 KB
Disk Clean-up	07/12/2019 10:09	Shortcut	2 KB
Event Viewer	07/12/2019 10:09	Shortcut	2 KB
iSCSI Initiator	07/12/2019 10:09	Shortcut	2 KB
ODBC Data Sources (32-bit)	07/12/2019 10:10	Shortcut	2 KB
ODBC Data Sources (64-bit)	07/12/2019 10:09	Shortcut	2 KB
Performance Monitor	07/12/2019 10:09	Shortcut	2 KB
Recovery Drive	07/12/2019 10:09	Shortcut	2 KB
Registry Editor	07/12/2019 10:09	Shortcut	2 KB
Resource Monitor	07/12/2019 10:09	Shortcut	2 KB
Services	07/12/2019 10:09	Shortcut	2 KB
System Configuration	07/12/2019 10:09	Shortcut	2 KB
System Information	07/12/2019 10:09	Shortcut	2 KB
Task Scheduler	07/12/2019 10:09	Shortcut	2 KB
Windows Defender Firewall with Advanc...	07/12/2019 10:08	Shortcut	2 KB
Windows Memory Diagnostic	07/12/2019 10:09	Shortcut	2 KB

Disk Management and File Types

Disk Management is one of the advanced utilities in different versions of windows that enables SAs to perform different storage management task. The disk management utility can be accessed from the control panel or at the command prompt via the diskmgmt.msc command to carryout the following:

i. Initializing new drive – activates a newly inserted disk that the system did not automatically recognise. Disk initialisation erases previously stored data on disk. Therefore, ensure existing files are backed-up before initialisation.
ii. Extend a basic volume – extending empty space on the drive that do not have previous volume. This is possible only on dynamic drives, not basic drives.
iii. Shrink a basic volume - decreasing the space used by primary partitions and logical drives by shrinking them into adjacent, contiguous space on the same disk for the purpose of creating new partitions.
iv. Change drive label (letter) – provide labels for or identifiers for different

Disk Management – Cont'd

v. Partition drive - separate a physical hard disk into several independent drive partitions for better data organisation, run different OS on same PC, reduce data loss threat, improve performance, etc
vi. Format drive – process of configuring a disk to create file system for data storage. It also check the disk for errors, scan and repair bad sectors, remove bad applications and sophisticated viruses on the disk.
vii. Mirror drive – creating redundancy that enables the content a drive automatically synchronised with another
viii. Defragment drive – Opitimize drive by removing empty spaces between file and pushing them to the end.
ix Create storage pool – combining several drives on a system into a single space to form a storage pool.

File systems

A File System is a data structure that stores data and information on storage devices (hard drives, floppy disc, etc.), making them easily retrievable. Different OS use different file systems, but all have similar features. The windows OS recognises 3 file systems, namely, FAT (12, 16 or 32), NTFS and exFAT.

The FAT (12, 16, or 32): This system uses what is known as a **File Allocation Table** (FAT) to index the files on the disc. This FAT is very simple to implement and use, but can be somewhat slow. It divides hard disks into one or more partitions that may be labelled as drives C:, D:, etc.

NTFS (New Technology File System): *NTFS* uses binary trees that allow for very fast access times. It builds on the features of FAT, adds new features, and changes a few others. It is a recoverable file system, which means that it keeps track of actions in the file system.

exFAT: is a lightweight file system used primarily in flash storage applications and SD cards. It has large file size and partition size limits.