**Topic A – Productivity, Entertainment & Other Software Applications**

Software:

* Calculator
  + Standard, Scientific and converter
* Alarms and Clock
  + Alarm, Timer, Stopwatch and World Clock
* Calendar
  + Allows for scheduling
* Music
  + Windows media player, groove music, or Music preview

Some Apps only on windows:

* Adobe Atmosphere
* AutoCAD Architecture
* Autodesk Revit
* Bandicam
* Daemon Tools
* Disc2Phone
* Microsoft Office
* Norton AntiBot
* Roxio Creator
* SHAZAM
* Solidworks
* SpyHunter
* SliderDock
* SYSTAT
* Vegas Pro
* WinFax
* Win

**Topic B – User Interface (Window Management & Input Devices) Window interfaces:**

Taskbar:

* Located at the bottom of the screen
* Allows you to locate and launch programs
* On all versions of windows

Speech Recognition:

* Voice commands
* Interprets spoken words to do a task

Start Menu:

* Primary location to locate and access files
* Accessed by clicking the windows logo in the bottom left of the screen

**Topic C – Memory Allocation, Management,& Devices:**

Virtual Address:

* A set of virtual memory addresses
* Virtual address
  + Does not represent the physical location of an object in memory
  + The system maintains a page table for each process
    - Which is an internal data structure
      * Used to translate virtual addresses into their corresponding physical addresses
  + Each time a thread references an address
    - The system translates the virtual address to a physical address
  + The virtual address space for 32 bit windows is 4Gb
    - Divided into two partitions
      * One for use by the process
      * One for use by the system

Memory Pools:

* The memory manager
  + Creates memory pools that the system uses to allocate memory
    - Nonpaged pool
      * Consists of virtual memory addresses
        + Which reside in physical memory as long as the corresponding kernel objects are allocated
    - Paged pool
      * Consists of virtual memory
        + Which can be paged in and out of the system
  + Both are in the region of address space that is reserved for the system and mapped into the virtual address space of each process

**Topic D – Process / Task Scheduling and Management (System Startup):**

Task Manager:

* A utility included in windows
  + Shows you what programs are running on your computer
  + Also gives limited control over those running tasks
  + To open press CTRL+ALT+DEL then select Task Manager
  + Shows Performance, Running processes, App history, Startup applications, Users, and etc

Task Scheduler:

* Automatically perform routine tasks on a chosen computer
  + Monitors whatever criteria you choose to initiate the tasks and then executes the task when the criteria is met
* Can be used to execute tasks such as
  + Starting an application
  + Sending an email
  + Showing a message box
* Tasks can be scheduled at
  + At specific time
  + Daily schedule
  + Weekly Schedule
  + Monthly Schedule
  + On Boot
  + When a User Logs on

**Topic E – Software Security, Updates & System Tools**

Windows Defender:

* Anti-Malware component of Microsoft windows
  + Comes with windows versions of windows after windows Vista
* Browser integration
  + Integration with internet explorer and Microsoft edge
    - Allows files to scanned as they are downloaded to detect malicious software
    - It does not integrate with non-Microsoft browsers but still scans after the file is downloaded
* Limited Periodic Scanning
  + Allows Windows defender to scan a system periodically if another antivirus is installed
* Block at First Sight
  + Uses machine learning to predict whether a file is malicious

Security Agents:

• Auto Start – Monitors lists of programs that are allowed to automatically run when the user starts the computer

• System Configuration (settings) – Monitors security-related settings in Windows

• Internet Explorer Add-ons – Monitors programs that automatically run when the user starts Internet Explorer

• Internet Explorer Configurations (settings) – Monitors browser security settings

• Internet Explorer Downloads – Monitors files and programs that are designed to work with Internet Explorer

• Services and Drivers – Monitors services and drivers as they interact with Windows and programs

• Application Execution – Monitors when programs start and any operations they perform while running

• Application Registration – Monitors tools and files in the operating system where programs can register to run at any time

• Windows Add-ons – Monitors add-on programs for Windows

Windows Update:

* Is a Microsoft service
* Automates downloading and installing Microsoft windows software updates
* Also delivers updates for Antivirus
  + Windows defender
  + Microsoft security essentials
* Updates to mitigate vulnerabilities against security exploits against Windows
* Releases updates on the second Tuesday of each month
  + But can provide update if urgently required

User account Control:

* Protects users by preventing malware from damaging a machine
  + Apps and tasks always run in non-administrator mode
  + Only if the administrator authorizes administrator level access to the system then can it do anything
    - When a software wants administrator access
      * A prompt is shown, and the user decides whether they want to give the software access.

Bit locker:

* Is a full drive encryption solution
  + Helps diminish unauthorized data access by strengthen file and system protections and can render data inaccessible in some cases

System Tools:

* Computer programs that can be used for Usually for specific tasks
* Divided into two different categories
  + Legitimate
  + Malicious
    - Can have effects similar to viruses and malware
    - When downloading these it will say
      * Potentially unwanted program or this program may harm your computer

**Topic F – File System & User Accounts:**

User accounts:

* Administrator
  + Controls the entire computer
* Standard
  + Can control most of the computer
  + Can not make big changes
    - Installing and uninstalling programs
* Child
  + Standard account with Family Safety Settings turned on
* Guests
  + Basically a standard account but you can not do anything except simple tasks like browsing and etc

File Systems:

* Computer files are stored on a storage medium with a given capacity
* Each byte of information on it has its offset from the storage start known as an address and is referenced by this address
* A storage
  + Can be represented by a grid with set of number cells
  + Any file saved to the storage gets its own cells
* Uses pair of sector and in sector to reference any byte of information
  + A sector is a group of bytes (512 bytes)
    - Minimum addressable unit
  + Used to make storage addressing more efficient
* Constant write/delete operations cause fragmentation
  + Where the files which were stored in whole units get divided into fragment
* Microsoft uses two major file systems
  + NTFS
    - The primary format
    - Includes
      * Access control
      * Encryption
    - Each file is stored as a file descriptor
      * In the master file table and file content
      * The master file table
        + Contains entries with all information about files like size, name, allocation and etc.
  + FAT
    - Came from the old DOS and has exFAT as its later extension
    - Consists of the file system descriptor sector, the file system block allocation table and plain storage space.
      * Files in fat are stored in directories
      * Each directory is an array of 32-byte records
        + Each defining a file
        + A file record defines the first block of any file
        + The next block can be found through the block allocation table

It contains an array of block descriptors

A zero indicates that the block is not used

Any other number other than zero relates to the next block of a file or a special value for the file end

* Microsoft also made ReFS file system
  + For server computers starting from windows server 2012
* ReFS
  + Organized in a form of the B+- Tree
  + High tolerance to failures due to new features
  + Copy-on-write
    - No metadata is modified without being copied
    - Data is not written over the existing data but into new disk space
    - Meaning the system stores a large quantity of older backups providing easy file recovery

**Topic G – Special Features of your OS:**

Cortana:

* Designed to help you get things done
* Provides answers and helps complete basic tasks
* Gives reminders
  + Time based reminders
  + Location based reminders
  + Photo reminders

Microsoft edge:

* Released for windows 10
* Integration with Cortana
* Features
  + Favorites
  + Reading list
  + Browsing history
  + Downloads
* Integrated Adobe Flash Player
* Integrates with Microsoft online platforms
  + Voice control
  + Search functionality
  + Dynamic information
  + Reading mode

Task View:

* Allows you to jump quickly between open applications and spread apps onto separate desktops
* Press Windows key+TAB to open virtual desktops
* Press ALT+TAB to switch between programs

**Topic H – Limitations of your OS:**

* Limitations on the size of the files name
* Files with the same name but in different cases can create undefined behavior
  + Example:
    - “hello.txt” and “HELLO.txt”
* The Backward slash is a reserved character and can not be used in file, directory or path names
* Windows 10 ARM
  + 64 bit apps will not work
  + Can not use x86 drivers
  + Older games and graphics may not work