**Worksheet 1 Hardware and software**

**Task 1 Disk Defragmentation**

1. Here is a simplified diagram showing the contents of a hard disk drive.

Over time, different programs have been installed, updated, removed and reinstalled.

1. A user installs a new graphics package (**GP**) that takes up 5 blocks and a screen capture utility (**SC**) that takes up 2 blocks. Add **GP** and **SC** to the diagram to show where the memory management system might store the new blocks.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| OS | OS | OS | OS | WP | WP | OS |  |
| Music | Browser |  | WP | WP | Data |  | Data |
|  | Data |  |  |  | Data | SS | Browser |
| OS | Music | SS |  | SS | Browser |  | SS |

1. Defragment the drive to put all of the programs and files together so that they fit into continuous segments. The OS has been done for you.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| OS | OS | OS | OS | OS | OS |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

1. Explain why the defragmented hard disk drive may improve performance.
2. Explain why a certain amount of free hard disk drive space is needed to carry out disk defragmentation.

2. Windows automatically creates “System Restore” points at regular intervals, for example daily or weekly. Why might you need to use a System Restore utility? Do some research to find out more about this utility and how you run it. Write down some facts you discover.

3. Complete the table below, describing each type of systems software

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Operating System** | **Utility** | **Library** | **Translator** |
| Disk defragmenter |  |  |  |  |
| Microsoft Windows |  |  |  |  |
| DLL file for web browsing |  |  |  |  |
| Android software |  |  |  |  |
| Backup manager |  |  |  |  |
| Java Compiler |  |  |  |  |
| Anti-virus program |  |  |  |  |
| Python interpreter |  |  |  |  |
| Module to generate random numbers |  |  |  |  |

4. Other than those above, name and describe the purpose of **two** different utility programs

# Task 2 Systems software

1. In a language which you are familiar with, write a program to compare the execution time of two algorithms in milliseconds. You will need to import a **library program** to do this.

An example of a Python program is given below; you can use this one or a different one using algorithms you have already written.

What does this program demonstrate?

#timing two methods of adding to a list.

#append and concatenate using +

import time # import a library program

def appendToList(n):

alist = []

t0 = time.clock()

for i in range(n):

alist.append(i)

t1 = time.clock()

runtime = round((t1 - t0)\* 1000,2)

print("time to append",n, " items to list ",runtime, "milliseconds")

def concatenateList(n):

alist = []

t0 = time.clock()

for i in range(n):

alist = alist + [i]

t1 = time.clock()

runtime = round((t1 - t0)\* 1000,2)

print("time to concatenate ",n, " items to list ",runtime, "milliseconds")

#main

k = int(input ("How many items do you want to add to your list? "))

appendToList(k)

concatenateList(k)

quit = input()