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| **Task 1: Basic NumPy** |
| Complete the following short basic NumPy tasks.   1. Create a 1D array of numbers from 0 to 9 2. Convert a 1D array to a 2D array with 2 rows 3. Write a NumPy program to create an array of the integers from 30 to 70. 4. Write a NumPy program to append values to the end of an array.   Extension   1. Write a NumPy program to find the number of rows and columns of a given matrix. 2. Write a NumPy program to create an array of all the even integers from 30 to 70. 3. Write a NumPy program to convert a list and tuple into arrays. 4. Write a NumPy program to create a structured array from given student name, height, class and their data types. Now sort the array on height. |

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| **Task 2: Mathematics** |
| Complete the following short Mathematics tasks   1. Write a NumPy program to add, subtract, multiply, divide arguments elementwise. 2. Write a NumPy program to round elements of the array to the nearest integer. 3. Write a NumPy program to get true division of the element-wise array inputs.     Extension   1. Write a NumPy program to multiply a 5x3 matrix by a 3x2 matrix and create a real matrix product. 2. Write a NumPy program to create a random array with 1000 elements and compute the average, variance, standard deviation of the array elements. 3. Write a NumPy program to calculate round, floor, ceiling, truncated and round (to the given number of decimals) of the input, elementwise of a given array. 4. Write a Python program to find the maximum and minimum value of 1D array. |

**Marking Criteria Task 1-2**

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|  | **Pass** | **Merit** | **Distinction** |
| **Syntax** | * Attempts to use Python syntax with some success | * Python syntax is largely accurate with some errors | * Python syntax is consistently accurate and appropriate to the task |

## **Marking criteria Task 1**

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|  | **Pass** | **Merit** | **Distinction** |
| **Code** | * Attempts to complete some of the short basic NumPy tasks | * Successfully completes all the short basic NumPy tasks | * Successfully completes the extension tasks which may require students to carry out own research |

## **Marking criteria Task 2**

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|  | **Pass** | **Merit** | **Distinction** |
| **Code** | * Attempts to complete some of the mathematics tasks | * Successfully completes all short mathematic tasks | * Successfully completes the extension tasks which may require students to carry out own research |