**SCHOOL OF COMPUTING (SOC)**

**Programming for Data Science**

**Practical 2 Submission Worksheet (Graded as part of CA3)**

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| **Instructoins:**   1. Complete, print and submit this worksheet to your lecturer. |

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| **Course/Module Class** | EP0302 PDS |

# Section 6 Tasks

### Task 1: Concatenate arrays

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| Copy and paste the Python code that you have written for this task in this area  a = np.array([[1,2,3],[ 4,5,6],[7,8,9]])  b = np.full((3,3),1.5)  c = np.arange(0,15).reshape(5,3)  print(np.concatenate((a,b,c),axis=0)) |

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| Paste a screenshot of the output of your program here |

# Section 8 Tasks

### Task 1: Basic Sorting

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| Copy and paste the Python code that you have written for this task in this area  arr\_1 = np.random.randint(100,200,10)  print("\*\*Before sorting\*\*")  print(arr\_1)  print("\*\*After sorting\*\*\n")  arr\_1.sort()  print(arr\_1) |

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| Paste a screenshot of the output of your program here |

# Section 9 Tasks

### Task 2: Boolean indexing

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| Copy and paste the Python code that you have written for this task in this area  a = np.array((np.arange(0,10),  np.arange(10,20),  np.arange(20,30),  np.arange(30,40)))  b = np.random.randint(100,200,(3,3))  print(a[a % 2 == 0])  print(b[b > 150]) |

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# Section 11 Tasks

### Task 1: sum,mean

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| Copy and paste the Python code that you have written for this task in this area  a = np.array((np.arange(0,10),  np.arange(10,20),  np.arange(20,30),  np.arange(30,40)))  # a  print("\*\*\* Sum of all numbers in a \*\*\*")  print(a.sum())  # b  print("\n\*\*\* Mean of all numbers in a \*\*\*")  print(a.mean())  # c  print("\n\*\*\* Sum of all numbers in a \*\*\*")  arrayStorage = a.sum(axis = 1)  for i in range (4):  print(f"Row {i+1} = " + str(arrayStorage[i])) |

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| Paste a screenshot of the output of your program here |

# Section 12 Tasks

### Task 1: Load numpy array from textfile and save it

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| Copy and paste the Python code that you have written for this task in this area  # done  print(f"There are a altogether {len(data)} rows in the data file {filename}")  # done  data\_years = data['year']  years = np.unique(data\_years)  print(f"\nThere are {len(years)} years of data captured from {years[0]} to {years[-1]}")  # done  ## Extract only the rows with Total Residents" - using boolean indexing  keyword = 'Total Residents'  data\_totalresidents = data[data['level\_1'] == keyword]  # done  ### Print out the years which has the highest total number of residents  max\_residents = data\_totalresidents['value'].max()  argmax\_residents = data\_totalresidents['value'].argmax()  print(f'\nYear with the highest total number of residents: {data\_totalresidents[argmax\_residents]["year"]}')  print(f'Population Count: {max\_residents} ')  #done  ### Print out the years which has the smallest total number of residents  min\_residents = data\_totalresidents['value'].min()  argmin\_residents = data\_totalresidents['value'].argmin()  print(f'\nYear with the lowest total number of residents: {data\_totalresidents[argmin\_residents]["year"]}')  print(f'Population Count: { min\_residents } ') |

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| Paste a screenshot of the output of your program here |