**[Test Information](https://lms.uwa.edu.au/webapps/assessment/take/launch.jsp?course_assessment_id=_84259_1&course_id=_67962_1&content_id=_2924698_1&isPasswordAttempted=true&password=b431e7627f2785fd8704d838b2d04f91&step=" \o "Hide)**

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| Description | **INSTRUCTIONS:**   * This examination paper comprises of containing 8 questions. * Attempt all questions and total marks are 100. * Answer to all the questions are to be written in the spaces provided. * No calculators or other aids are allowed.   **NOTE: Library modules are not allowed to be imported for any of the question in this exam.** |
| Instructions |  |
| Timed Test | This test has a time limit of 2 hours.This test will save and be submitted automatically when the time expires. Warnings appear when **half the time**, **5 minutes**, **1 minute**, and **30 seconds** remain. |
| Multiple Attempts | This test allows 3 attempts. This is attempt number 1. |
| Force Completion | This test can be saved and resumed at any point until the time has expired. The timer will continue to run if you leave the test. |
|  | Your answers are saved automatically. |

**Remaining Time:**

**02 minutes, 03 seconds.**

**Expand Question Completion Status:**

**QUESTION 1**

1. Define a Python function string\_combine(seq) which, given a tuple or list seq, returns a string concatenating (combining) all the elements of the input tuple or list converted to upper case string.

For example, string\_combine(["Hi",4.21,True,"dude"]) returns 'HI4.21TRUEDUDE'

[5 marks]

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**5 points**

**QUESTION 2**

1. Define a Python function extract25(nlist), which given a list of integer data as an input, returns a list which holds the integers of nlist which are divisible by 2 and 5. The final output must have ascendingly sorted integers which are divisible by 2 followed by ascendingly sorted integers which are divisible by 5. The integers which are not divisible by 2 or 5, and integers which are divisible by both 2 and 5 should be ignored and must not be part of the output list.

For example, extract25([1,4,5,8,10,25,6,15,9,30,98]) will return [[4, 6, 8, 98, 5, 15, 25]

[5 Marks]

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**5 points**

**QUESTION 3**

1. Define a Python function sortStaff(staff) which, given a dictionary staff of staff’s IDs and their information (name, phone, salary and year of joining) as keys and values respectively, returns the list of tuple in the format (name, ID, salary, year of joining) sorted by salary in descending order. In case two or more staff members have same salary then they are sorted by their names in ascending order.

For example, sortStaff({1354: ["Tim Stones", "+6147878787", 135000, 2000],1234: ["Ali Khan","+61847854785",135000,1999],4321: ["Ajmal Khan", "+61478478",115000,2010],4444:["Chris Walker", "+61444444",200000,1970]}) returns [('Chris Walker', 4444, 200000, 1970), ('Ali Khan', 1234, 135000, 1999), ('Tim Stones', 1354, 135000, 2000), ('Ajmal Khan', 4321, 115000, 2010)]

*Hint: Think about using sort() function with lists*.

[7 Marks]

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**7 points**

**QUESTION 4**

1. [Use recursion to solve this problem]

Define a Python function reverse(email), which takes an email address email as string and returns an email address as string which has the characters in reverse order on both left and right side of character '@' than the input.

For example, reverse('hello@gmail.com') will return 'olleh@moc.liamg'. It can be observed that 'hello' and 'gmail.com' are both reversed in the output.

*Note: Recursion must be used to solve this question. Looping or reverse methods for reversal are not allowed.*

[13 Marks]

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**13 points**

**QUESTION 5**

1. Below mentioned is the series and summing higher number of terms provides better approximation.

where “!” represents the factorial such as 0!=1, 1!=1, 2!=2 x 1=2, 3!=3 x 2 x 1=6 and so on.

Define a Python function log\_cosh(tol) which, returns the sum of the above series till the absolute value of the term becomes smaller than tol. The returned value should be rounded to 6 decimal places. However, calculations are not rounded off at any stage in the program.

For example, log\_cosh(0.01) returns 0.6 which is obtained by adding first three terms only because the absolute value of fourth term 1/336=0.00297619 becomes smaller than the input tol to the function i.e. 0.00297619<0.01

[15 Marks]

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**15 points**

**QUESTION 6**

1. Write a Python function extract\_strings(lst) which can extract strings and return a string which concatenate all the strings from the input list lst. However, it is possible that the input list, lst, possibly contain other lists or tuples (which can be empty or further contain more lists or tuples). You can assume that the lists only contain strings, numerical data, lists and tuple.

For example, extract\_strings(["hello","world",10,32.32," CITS1401"]) returns 'helloworld CITS1401'

Similarly extract\_strings([("hello","world"),[],10,32.32,[" CITS1401"],33]) also returns 'helloworld CITS1401'

[20 Marks]

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**20 points**

**QUESTION 7**

1. ABC is an international company and has multiple office all over the world. To improve the team building skills and diversity, the company started a program to build teams comprising an employee from different offices. As a pilot project three offices are selected and their employees are grouped together to build all possible combinations for the team.

Write a python function team(ABD\_dict) for the above situation which, given a dictionary as input where each key is the office location and its value is a list of employees, and returns a list of lists containing all possible combinations of teams of employees. In each combination of team which is a list, each member of the team is from different office location. Remember, this is for the pilot project and is restricted to only three office locations but we do not know how many employees are in each office.

For example, team({'London':["Max","Sarah"],"Perth":["Ali","Eli"],"Cairo":["Fatima","Sana"]}) returns

[['Max', 'Ali', 'Fatima'], ['Max', 'Ali', 'Sana'], ['Max', 'Eli', 'Fatima'], ['Max', 'Eli', 'Sana'], ['Sarah', 'Ali', 'Fatima'], ['Sarah', 'Ali', 'Sana'], ['Sarah', 'Eli', 'Fatima'], ['Sarah', 'Eli', 'Sana']].

[15 Marks]

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**15 points**

**QUESTION 8**

1. Write a Python function donors(filename) which, given a file name reads the file, then extracts the donors’ names and their deposits (separated by character “,“), ranks the donors according to the deposits and writes them to text file ranked.txt. The file filename will be a text file in which each value is separated by a comma "," character and each line of values is separated by a new line ("\n") at the end. Each extracted Donor’s name and total amount of deposits are to be stored in ranked.txt in such a way that the values are separated by a comma "," and each donor’s data is stored in a separate line sorted by total deposited amount in descending order. The data for each donor is stored in two lines in the input file. The first line contains the donor’s details while the second line contains the donations separated by ",". Therefore your solution needs to read two rows from the input file to extract the corresponding data from each donor.

The methodology for creating the ranking is by sorting the donor’s by total deposited amount (descending order) and write the rank of the donor followed by the name and total deposited amount. The first line of the ranked.txt must have the headings: Rank,Donor,Amount

For example, a file "donationsfile.txt" contains following lines of text.

John Smith,Age:48,+61444444, 24 smith Road Crawley 6009

77,85.5,650,46

Sarah Duth,Age:21,+61454545, 1 Broadway raod Nedlands 6010

88,43,65.76,900,345.5

Ali Hassan,Age:40,+6185457845,1/30 Stirling Highway Nedlands 6011

60.5,34.65,800,876.75,135.37,876

Johnny Depp,Age:57,+4478895454, 31 Fairway Perth 6000

33,1598,342,1000

Neo Morpheous,Age:85,+1424554, 100 Matrix Avenue Fiction 9999

950.5,2134,3564,1000,5436.5

Running the function donors("donationsfile.txt") creates the file ranked.txt having following contents.

Rank,Donor,Amount

1,Neo Morpheous,13085.0

2,Johnny Depp,2973.0

3,Ali Hassan,2783.27

4,Sarah Duth,1442.26

5,John Smith,858.5

*Note: You need to ensure that function should terminate gracefully if there are any I/O errors*