COMP101: Introduction to Programming 2019-20

Assignment-06

Issue Date: **Tuesday 19th November 2019**

Submission Date: **Wednesday 27th November (17:00)**

Summary:
Assignment-06 is worth 16% of the total marks for COMP101.
The assignment uses sequencing, selection, iteration, lists, function definitions and I/O control of strings and numbers.

You must submit an attempt at this assignment else a fail grade for the module will be awarded. There is an optional extended requirements you can attempt if you wish.

Submission details: Two files are required:
Submit one .py file AND one .pdf file

1) .py filename format:
familyName_givenName-CA06.py e.g. Smith_John-CA06.py

This file contains:
i) Your Python code edited in IDLE (NOT the Shell window)
The first 3 lines should be comment lines as follows:
#Your University id followed by Smith_John-CA06.py
#Month and Year of coding
#Brief description of the problem solved

AND

2) .pdf filename format:
familyName_givenName-CA06.pdf e.g. Smith_John-CA06.pdf

This file contains:
i) A test table (use the test table template for evidence of testing)
ii) Pseudocode

Deadline Detail:

By the deadline indicated:

Your documents are to be submitted electronically via the department submission server at https://sam.csc.liv.ac.uk/COMP/Submissions.pl

Earlier submission is possible, but any submission after the deadline attracts the standard lateness penalties - see http://www.csc.liv.ac.uk/department/regulations/practical.html

Plagiarism and collusion guidelines will apply throughout the assignment submission

Assessment Information

Assignment Number	06 (of 07)
Weighting	16%
Assignment Circulated	As on front sheet
Deadline	As on front sheet
Submission Mode	e-submission
Learning outcome assessed	LO1: Identify principles and practice of using high level programming constructs to solve a problem LO2: Use relevant data structures to solve problems LO4: Use a suitable Integrated Development Environment to carry out implementation, interpretation/compilation, testing and execution LO5: Identify appropriate design approaches to formulate a solution to a program
Purpose of assessment Marking criteria	Assessment of using sequence, selection, iteration constructs, arrays and defined functions to control I/O of strings and numbers in successful calculations for a given problem. Modularisation of code. Total marks over seven questions as a percentage
Submission necessary in order to satisfy module requirements?	Yes Assignments are not marked anonymously
Late Submission Penalty	Standard UoL Policy.

Requirements.
Design, implement and test a program that manipulates data structures and analyses the content of the structures.
Produce a forecasting model to allow users to analyse revenue against costs.

The latest production of the blockbuster, 'Harry of the Rings' has transferred to the stage. It is trialling in five theatres, each in a different city:
The cast are travelling to each city via a chartered aircraft of 25 seats.

The position of the aisle is incidental – imagine the seating as 3-on-left with 2-on right or vice-versa – it doesn't matter for the problem scenario.
Row-1 is at the front of the aircraft, directly behind the cockpit
Row-5 is at the rear of the aircraft

Row-1 = seats 1 to 5	=	price-band-A	First Class
Row-2 = seats 6 to 10	=	price-band-A	First Class
Row-3 = seats 11 to 15	=	price-band-B	Economy Class
Row-4 = seats 16 to 20	=	price-band-B	Economy Class
Row-5 = seats 21 to 25	=	price-band-B	Economy Class

The aircraft will transport the cast five times

The airline operator sells only seats and one drink for each passenger in any seat. No other facilities or consumables are in the itinerary.

INPUTS:

1. The cost to operate one flight is £5,000

2. The cost of one seat in each of band-A and band-B
   Seats in band-A cost twice as much as seats in band-B

3. Wholesale cost of one drink. The markup on each drink sold is 50%

PROCESS:

Part-1:

a) Assume the plane is full for every flight:
Depending on seat pricing, how many flights are needed to make a profit based on five flights (i.e. seat sales only);

b) Assume the plane is full for every flight:
Depending on seat pricing and cost of one drink, how many flights are needed to make a profit based on five flights with each customer buying one drink (i.e. one seat + one drink);

Part-2:

a) Assume the plane is not full for each flight (i.e. some actors prefer not to fly and will go by train etc).

We don't know how many will take the flight, but we'll project on the plane being at least half-full for each flight to take place.

How long will it take to make a profit based on seat sales alone? (i.e. no drinks)
Use an average of the seat sales (only) over five flights.

OUTPUT:

For a full flight:
a) A plan of the seats sold:
b) Analysis of flight cost against seats sold;
c) Analysis of flight costs against seats sold with consumables;

For a part-full flight:
a) Five plans of the seats-only sold (i.e. no consumables included) for each flight
b) Analysis of flight costs against seats-only sold (i.e. no consumables)

Output design is at your discretion:

CONSIDERATIONS:
Some enhancements to consider?

- Identify the break-even point?

- From analysis of previous models (don't use your own that you have generated for this consideration) it appears that the window seats on the left-hand-side of the aircraft are popular with passengers? What is the revenue if all of these left-hand window seats are sold?

- For a part-full flight, analyse the 'spread' of the seats bought, by seat-banding?

- What happens to profit if part-full flights sell one drink to each passenger?

- Remember, the market is very competitive – lowest prices usually win the customer. However, companies are always under pressure to return a quick profit

- etc

NOTES:
If you have trouble automating the processes, alternative design solutions can be considered.
A complete range of marks cannot be considered in designs that do not meet the full specification, but marks will be allocated appropriately to reflect the effort put in to any alternative design

Don't extend the specification too far, e.g. the operator only sells seats and drinks, so there is no need to include other consumables etc, if attempting further cost analysis. Base any additional work on the data required in the specification

Mark scheme
Analysis and Design 25%

Implementation 60%

Quality of dashboard 15%

Guidance:
Assessment is based on effective structure manipulation and investigation, design, clarity, accuracy and appropriate use of code, testing and documentation.

The mark scheme looks for:
An accurate and easy-to-use analysis of the figures based on processing of a suitable data structure and using (as appropriate) sequence, selection, iteration and modularisation with a call to main().

Efficient use of variables and commentary to make aid clarity and readability, thus aiding maintenance and debugging

Appropriate use of output design and techniques that are of benefit to the user

Appropriate testing to determine accuracy and/or problems (which may be documented in the test table comments column)

Note:
Because submission is handled electronically ANY FILE submitted past the deadline will be considered ONE DAY late. Late submissions are subject to the standard University Policy.