



## EXAMINATION PREPARATION

**MODULE:** *Software Development for Engineers (EM108)*

**PROGRAMME(S):**

*CE B.Eng. in Common Entry into Engineering*  
*BMED B.Eng. in Biomedical Engineering*  
*ME B.Eng. in Mechatronic Engineering*  
*CAM B.Eng. Mechanical & Manufacturing Eng*  
*ECE BEng Electronic & Computer Engineering*  
*MWB BSc Manufacturing Eng with Business*

**YEAR:** *1 (one)*

**EXAMINER:** *Dr. Gabriel-Miro Muntean (ext. 7648)*

**TIME ALLOWED:** *2 hours*

**INSTRUCTIONS:** *Answer THE QUESTION.*

**THE USE OF PROGRAMMABLE OR TEXT STORING CALCULATORS  
IS EXPRESSLY FORBIDDEN**

**Please note that where a candidate answers more than the required number of questions, the examiner will mark all questions attempted and then select the highest scoring ones.**

This booklet contains 4 pages, including the cover sheet.

**PLEASE DO NOT TURN OVER THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO**

*Requirements for this paper (Please mark (X) as appropriate)*

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*Log Tables*  
*Graph Paper*  
*Dictionaries*  
*Statistical Tables*  
*Bible*

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*Thermodynamic Tables*  
*Actuarial Tables*  
*MCQ Only – Do not publish*  
*Attached Answer Sheet*  
*Exam Paper to be returned with Booklet*

**Dublin City University**  
**School of Electronic Engineering**  
**School of Mechanical and Manufacturing Engineering**

**Computer-based Exam Directions**

The examination consists of one problem. You need to design a solution, write the code using the C programming language, test your program, write a report and submit your work. It is strongly recommended that you plan your allocation of time carefully in advance, and stick to this allocation during the exam. No extra time will be awarded and no excuse (such as lost data) will be accepted.

A report template is available at the end of this document and can also be downloaded from the EM108 website:

<http://www.eeng.dcu.ie/~em108/2015-2016/Exams/Exam/report.doc>

## Problem

[Total Marks: 100]

A DVD rental shop specializes in 6 categories of movies: “Documentary”, “Action”, “SF”, “Drama”, “Romance” and “Cartoons”. Often movies are associated with different types of merchandise such as toys, bedroom accessories, birthday cards, etc. with which they share the same 6 digit alphanumeric code. The first file **dvds.txt** contains rows of data, each containing six pieces of information about movies, separated by a space. In each row, the first information is the movie category, the second is the movie name (written with no spaces as one word: e.g. “StarWarsVII”), the third piece of information is the movie release year, the fourth piece of data is the movie price, the fifth the alphanumeric code and the last is the discount. The discount is expressed as a percentage of the movie price. The second file **merch.txt** contains rows of data, each containing three pieces of information about movie associated merchandise, separated by a space. In each row, the first information is the associated movie alphanumeric code, the second the merchandise name, and the third its price.

You are required to develop a program which by using a menu (**5 marks**) will repeatedly perform the following steps:

1. Read the data from these files into two arrays of structures. Assume a maximum of 20 characters for each name. Note there are no spaces introduced between the potential multiple words of any name. Once read, the program should not allow data to be read again and a warning message will be displayed instead. (**10 marks**)
2. Ask the user for a movie name and identify the discount for this movie. Next find all the merchandises associated with this movie and for each of them, apply the movie discount (e.g. 10%), and compute the new price. Use at least two functions. (**20 marks**)
3. Read a movie category and a year of release. For movies that belong to the indicated category, apply a price reduction of 20%. For movies released strictly before the indicated year, apply a price reduction of 30%. The discounts may add up. (**15 marks**)
4. Read a file name from the keyboard and write in a file with this name data such that on each line information is stored in the format below. (**10 marks**).  
**moviename, category, yearofrelease, price, discountedprice**  
e.g. StarWarsVII SF 2015 10 8  
note: in the example, a discount of 20% was applied on SF movies
5. Read a movie category from the keyboard, and for this, list on the screen in a nice table all the movies available, their year of release and their price before and after discount. (**5 marks**)

The program must conform to the following guidelines:

1. The program should include at least THREE functions (**5 marks**).
2. The program should make good use of string functions (**5 marks**).
3. The program should demonstrate good coding practices with regard to spacing, indentation, commenting, etc. (**5 marks**)
4. The program should compile and execute (**10 marks**)
5. Briefly test the program. Record and report all test results (**10 marks**).

## File Listing: dvds.txt

SF StarWarsVII 2015 10.00 SW7\_15 10  
SF TheMartian 2015 14.99 TM\_15 0  
Documentary Hibernia 2016 10.00 HB\_16 10  
Drama Enemy 2014 5.00 EN\_14 10  
Romance TheLetter 2011 5.00 TL\_11 10

## File Listing: merch.txt

SW7\_15 ToySoldier 10.00  
SW7\_15 Robot 8.00  
SW7\_15 PrincessDoll 12.00  
TM\_15 Rover 30.00  
SW7\_15 Spaceship 15.00  
SW7\_15 Beddingset 20.00  
SW7\_15 ToyGun 5.00  
SW7\_15 LegoSet 50.00  
TM\_15 RocketToy 20.00  
TM\_15 SolarPanel 10.00

## TEMPLATE FOR EXAM REPORT

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### EM108: SOFTWARE DEVELOPMENT EXAM PREPARATION REPORT

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Examination ID:

Class:

Exam Date:

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Plan

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Development

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Testing

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**[End of the exam]**