DUBLIN INSTITUTE OF TECHNOLOGY

BSc. (Honours) Degree in Computing / BSc. (Honours) Degree in Computer Science / BSc. (Honours) Degree in Computer Science International

Year 1

SUMMER EXAMINATIONS 2014/2015

PROGRAMMING
[CMPU1025]

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TUESDAY 12TH MAY 9.30 A.M. – 12.30 P.M.

3 HOURS

ATTEMPT **FOUR** QUESTIONS.

SECTION A **MUST** BE ATTEMPTED.
ATTEMPT ANY **THREE** QUESTIONS IN SECTION B.

SECTION A – 30 MARKS
SECTION B – 70 MARKS

SECTION A
(30 marks)

1. (a) What is wrong with the following code segment?

```
char letter = "A";

printf("Enter a letter/n");
scanf("%c", letter);
```

(3 marks)

(b) Write a C structure to hold a bank customer's first name, surname, account number and balance.

(3 marks)

(c) Explain the difference between a `while` loop and a `do-while` loop?

(3 marks)

(d) What is wrong with the following code segment?

```
for (int i=0, i<10, i--)
{
    printf("Value of i is : ", i);
}
```

(3 marks)

(e) Regarding parameters, what is the difference between *Pass by Value* and *Pass by Reference*?

(3 marks)

(f) Declare a function prototype that passes two parameters and returns an integer, where the first parameter is a character pointer and the second parameter is an array of floats.

(3 marks)

(g) Briefly, explain *auto*, *static* and *register* variables.

(3 marks)

(h) Show how to output the contents of the following array using pointer notation:

```
float numbers[3] = {1.1, 2.2, 3.3};
```

(3 marks)

(i) Show how you would display the following sentence:

"I save my C programs on my U:/ drive", said the student.

(3 marks)

(j) Using a sample piece of C code for each, explain the use of `puts()` and `gets()` functions.

(3 marks)

SECTION B
(70 marks – Attempt THREE questions)

2. Write programming statements to accomplish the following:

(a) Define two 1-Dimensional float arrays called **Euro** and **Dollar** containing 5 elements each.

(2 marks)

(b) Using a *FOR* loop, show how you would read in values from the keyboard into the **Euro** array.

(6 marks)

(c) Copy the values in the **Euro** array into the **Dollar** array.

(6 marks)

(d) Assuming that the conversion rate is \$1.15 Dollars = €1 Euro:

(i) Fill the **Dollar** array with new values based on the formula above.

(3 marks)

(ii) Print the contents of the corresponding elements of both arrays, i.e. print the first element of the **Euro** array beside the first element of the **Dollar** array, the second element of the **Euro** array beside the second element of the **Dollar** array, etc. and continue this sequence.

(6 marks)

3. (a) Write a function to test whether an integer lies within a range of values. You may assume the function prototype will be:

```
int range_test(int val, int low, int high);
```

where: `val` is the value to be tested
`low` is the lower value in the range
`high` is the higher value in the range

The function should return 1 if the value is in the specified range, otherwise it should return 0.

(10 marks)

(b) Using the following function prototype and variables:

```
void swap (int *, int *);

int num1 = 27;
int num2 = 4;

printf("Numbers in ascending order are %d and %d",
                num1, num2);
```

Write a **program**, including the swap function, to swap the contents of `num1` and `num2` so that their contents can be displayed in ascending order. The contents of `num1` and `num2` must be **passed by reference** from `main()` to the swap function.

(13 marks)

4. (a) Show the output of the following code segment:

```
char name1[] = "Michael";
char name2[] = "Mark";
char *name3 = "Patrick";

int len = 0;
len = strlen(name1);

printf("%d %d %d %d %d", strlen(name1),
 strlen (name2), strlen(name3),
 strlen("Rob"), len);
```

(5 marks)

(b) Using the code segment in part (a), write a program to do the following:

(i) Define a character array called `new_name`. Copy the string in `name2` into `new_name`.

(6 marks)

(ii) Concatenate the string in `new_name` to the end of the string: "The name is "

(6 marks)

(iii) Compare the strings in `name1` and `name3`. Print whether these names are the same or different.

(6 marks)

5. Globe Ireland Airlines is the name of an airline that carries passengers on a daily basis between Ireland and European cities.

(a) Design a structure template to hold the following passenger details flying with Globe Ireland Airlines:

- Flight number
- Flight date (dd/mm/yy)
- Passenger surname
- Passenger first name
- Seat number

(5 marks)

(b) Write a function to enter the details of 2 passengers flying on the same flight, on the same date.

(9 marks)

(c) Write a function to display the details of the passengers entered in part (b) above.

(9 marks)

6. Some strings in the English language are spelled the same way backwards e.g., "kayak", "radar", "never odd or even", etc. Write a program in C to do the following:

(a) Enter a string.

(4 marks)

(b) Check if the string is spelled the same way backwards. Display appropriate messages indicating whether it is or is not.

(20 marks)