DUBLIN INSTITUTE OF TECHNOLOGY

DT211C BSc. (Honours) Degree in Computer Science (Infrastructure)

Year 1

DT228 BSc. (Honours) Degree in Computer Science

Year 1

DT282 BSc. (Honours) Degree in Computer Science (International)

Year 1

SUMMER EXAMINATIONS 2017/2018

PROGRAMMING
[CMPU1025]

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TUESDAY 8TH MAY 2.00 P.M. – 5.00 P.M.

3 HOURS

ATTEMPT **THREE** QUESTIONS.

QUESTION 1 (SECTION A) **MUST** BE ATTEMPTED.
ATTEMPT ANY **TWO** QUESTIONS IN SECTION B.

SECTION A – 36 MARKS
SECTION B – 64 MARKS

SECTION A
(36 marks)

1. (a) Correct the errors in the following code segment:

```
int i = 0;
int age[10];

for (i = 0; i <= 10; i++)
{
    if (i = 5)
    {
        age[] = i;
    }
}
```

(3 marks)

(b) Show how you would declare an array containing the string "Hello you".

(3 marks)

(c) Identify and correct any errors in the following code segment.

```
int a = 1, b = 2, c;
int *pa = &a;
int *pb = &b;

c = *pa/*pb;
```

(3 marks)

(d) Given the following variable definitions:

```
int values[5] = {1,5};
int *ptr = values;
```

What is in the array `values` after each of the following?

(i) `*(ptr+2) = 7;`

(ii) `*ptr = 0;`

(iii) `*(ptr+4) = *(ptr+2);`

(3 marks)

(e) Explain briefly the use of the keywords *auto*, *static* and *register* as can be declared before variable names when used with functions.

(3 marks)

(f) Give two differences between *malloc()* and *calloc()* used to dynamically allocate memory in C.

(3 marks)

(g) Regarding functions, what is the difference between passing arguments by value and passing arguments by reference?

(3 marks)

(h) Using a `printf` statement, show how you would display the following sentence:

```
"c:\ is the root directory of drive c", said the teacher.
```

(3 marks)

(i) Correct any errors in the following code segment:

```
char name1[] = "Alexander";
char name2[5] = "John";
strcpy (name2, name1);
puts("%s",name2);
```

(3 marks)

(j) Explain the following code segment:

```
typedef float * FLOAT_POINTER;
FLOAT_POINTER p1, p2;
```

(3 marks)

(k) Show the C code to open a file called "file.txt" for reading only.

(3 marks)

(l) Write a structure template for a shopping customer record to include the customer's: first name, surname, date of birth, telephone number and new customer status (i.e., yes/no).

(3 marks)

SECTION B
(64 marks – Attempt TWO questions)

2. **(a)** Using the following array definition:

```
float my_array[5] = {0};
```

Write a program using **pointer notation only** to enter any five floating-point numbers, then display the contents of the array on a separate line.

(16 marks)

(b) Given the following array:

```
char barack[]={'Y','E','S',' ','W','E',' ','C','A','N'};
```

Using **pointer notation only**, write a program that replaces all the blank elements in the character array with the underline character '_'.

(16 marks)

3. Write a program that reads a string from the keyboard and **uses separate functions** to do the following:

(a) Determine the most common used vowel (a, e, i, o, u) in the string. Your function should display a message indicating this vowel and the number of times it is used (e.g. "The vowel 'a' is most common. It is used 4 times.").

(15 marks)

(b) Find the number of characters in the string you entered. Using this number, display the string in reverse.

(10 marks)

(c) Concatenate the string you entered to the end of the following string and display the new string:

```
char sentence[40] = "I entered the string "
```

(7 marks)

4. Fig. 1 shows the Fibonacci sequence. The formula to calculate the next number in the sequence is $F_{n+2} = F_{n+1} + F_n$, where n represents the current number in the sequence.

Write a program that will do the following:

(a) Open a text file called "number.txt". Assume this file only contains the integer number 89. Read this number into your program.

(12 marks)

(b) Display all the numbers according to the Fibonacci sequence, separated by commas, up to the number 89, which you read from the file in part (a).

(20 marks)

```
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
```

Fig. 1