DUBLIN INSTITUTE OF TECHNOLOGY

KEVIN STREET, DUBLIN 8.

BSc. (Honours) Degree in Computer Science

Year 1

SEMESTER 2 EXAMINATIONS 2012/2013

PROGRAMMING

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Tuesday, 14th May 1.00 pm – 4.00 pm

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?

```
int value[5] = {2,4,6,8,10};

if (value[5] = 10);
{
    printf("This value is Ten");
}
```

(3 marks)

(b) Explain the output given from the following code segment:

```
printf("%3.2f", 7.128);
```

(3 marks)

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

(3 marks)

(d) Show how you would define the string "Hello World".

(3 marks)

(e) What is the purpose of the *indirection operator* * ?

(3 marks)

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

```
int *p;
*p = 100;
```

(3 marks)

(g) Change the following code segment to output the contents of the array using <u>pointer notation</u>:

```
int numbers[3] = {2, 4, 6};
int i;

for (i = 0; i < 3; i++)
{
    printf("%d", numbers[i]);
}
```

(3 marks)

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

```
c:\ is the root directory of drive c.
```

(3 marks)

(i) What is the difference between an `auto` and `static` variable?

(3 marks)

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

(3 marks)

SECTION B
(70 marks – Attempt THREE questions)

2. (a) Define two one-dimensional floating point arrays called **Miles** and **Kilometres** containing five elements each.

(2 marks)

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

(6 marks)

(c) Copy the values in the **Miles** array into the **Kilometres** array.

(6 marks)

(d) Using the following formula:

Kilometres = (Miles / 5) * 8

1. Fill the **Kilometres** array with new values based on the formula above.

(4 marks)

2. (Print the contents of the corresponding elements of both arrays, i.e. print the first element of the **Miles** array beside the first element of the **Kilometres** array, the second element of the **Miles** array beside the second element of the **Kilometres** array etc., and continue this sequence.

(6 marks)

3. Given the following arrays:

```
float gallons[5];
float miles[5];
float mpg[5];
```

Write a program, **<u>using pointer notation only</u>**, to access the elements of each array to do the following:

(a) Enter values into the **gallons** array and **miles** array.

(8 marks)

(b) Calculate and fill the **mpg** array using the values contained in the **gallons** array and **miles** array with the formula:

mpg = miles / gallons

Display the contents of the **mpg** array.

(15 marks)

4. **(a)** Using appropriate data types, design a structure template to hold the following driver's licence information:

- First name
- Surname
- Date of Birth
- Height
- Eye colour
- Weight

(5 marks)

(b) Using the structure template in part (a), create two variables in your `main()` function to represent two separate people. Write **a function** that is used to enter the driver licence details for a person. Show how you use this function to enter the driver licence details for the two separate people you created in your `main()` function.

(9 marks)

(c) Write **another function** to display the details of the drivers entered in part (b) above.

(9 marks)

5. **(a)** Using the following prototype:

```
int sum_array(int *array, int no_of_elements)
```

Write **a program** that reads in values into an integer array and implements the above function to calculate the sum of the array.

(15 marks)

(b) Define and implement another function, to calculate the average value of the elements in the array.

(8 marks)

6. Write a program that reads a sentence and checks for any occurrences of the word "and" in the sentence. Your program should use functions to implement the following:

(a) Read the sentence from the keyboard.

(5 marks)

(b) Check for the occurrence of the word "and".

(18 marks)