



Department of Electronic and Computer Engineering

## **B142L Introduction to Computing**

### **Semester 2 Examination**

**1.5 hours**

**Instructions:**

**Write your student ID number clearly on page 2.**

Write your answers to all 10 questions within the spaces provided in this examination paper. Handwritten notes are permitted with this examination.

**Additional Information:**

This is an open book exam

**Provided:**

NIL

**Calculators:**

Casio FX 85 Series or Casio FX 83 Series

**Examiners:**

Mr C Nguyen

**External Examiner:**

Dr A Rossiter

**Student ID Number**

## QUESTION 1

Consider the following source code. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary.

```
01: #include <stdio.h>
02:
03: void countDown( int );
04:
05: int main( void )
06: {
07:     int input;
08:
09:     scanf( "%d", &input );
10: }
```

- a) Add source code to **define the countDown() function which displays numbers starting at the input value and decreasing by one until it reaches zero**. For example, the function would display the following input when the input value is 6.

6 5 4 3 2 1 0

[8 Marks]

- b) Modify the source code to **call the countDown() function in the program to display the output**.

[2 Marks]

## QUESTION 2

- a) Place an "X" in the box next to **3 terms** that are most directly related to **selection and decisions** in the C language. [3 Marks]

<input type="checkbox"/>	continue
<input type="checkbox"/>	break
<input type="checkbox"/>	else
<input type="checkbox"/>	when
<input type="checkbox"/>	if

<input type="checkbox"/>	and
<input type="checkbox"/>	then
<input type="checkbox"/>	test
<input type="checkbox"/>	scanf
<input type="checkbox"/>	printf

- b) Write a C program to **ask for an input integer and display output messages to indicate whether the input is a positive number that is a multiple of 3, 4 or 5**. Show or use all the terms selected in part (a). [7 Marks]

### QUESTION 3

Consider the following source code. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary.

```
01: #include <stdio.h>
02:
03: int main( void )
04: {
05:     char input[ 25 ] = { '\0' };
06:     int counter = 3;
07:
08:     scanf( "%s", input );
09:
10:     while ( input[ counter ] != NULL )
11:     {
12:         printf( "%c", input[ counter ] );
13:         counter++;
14:     }
15: }
```

- a) List the program output when the **input value is the string "mountain"**. [4 Marks]

- b) Describe **the longest possible output display** using this program. [6 Marks]

## QUESTION 4

**Modify the following source code to correct all errors.** The program is intended to ask for an input string and test if it is a valid password format. A valid password must be 4-16 characters in length and must not contain spaces. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary. **[10 Marks]**

```
01: #include <stdio.h>
02: #include <ctype.h>
03:
04: int main( void )
05: {
06:     char password[ 65 ] = { '\0' };
07:     int valid = 1, index;
08:
09:     scanf( "%64c" );
10:     for ( index = 0; (valid == 1) || (index < strlen( password )); index++ )
11:     {
12:         if ( strlen( password ) > 4 ) valid = 0;
13:         else if ( index > 16 ) valid = 0;
14:         else if ( isspace( index ) ) valid = 0;
15:     }
16:
17:     if ( index == 1 ) printf( "Valid password" );
18:     else printf( "Invalid password" );
19: }
```

### QUESTION 5

a) Place an "X" in the box next to **3 terms** that are most directly related to the use of **iterative loops** in a C program. [3 Marks]

<input type="checkbox"/>	repeat
<input type="checkbox"/>	assign
<input type="checkbox"/>	while
<input type="checkbox"/>	then
<input type="checkbox"/>	main

<input type="checkbox"/>	head
<input type="checkbox"/>	body
<input type="checkbox"/>	tail
<input type="checkbox"/>	declaration
<input type="checkbox"/>	initialization

b) Write a C program to **display the ASCII value of all uppercase letters, i.e. A-Z** (inclusive). Show or use all the terms selected in part (a). [7 Marks]

## QUESTION 6

Consider the following source code. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary.

```
01: #include <stdio.h>
02: #include <stdlib.h>
03: #include <time.h>
04:
05: int getRandomDayOfWeek( void );
06:
07: int main( void )
08: {
09:     srand( time( 0 ) );
10:     int dayOfWeek = getRandomDayOfWeek();
11: }
```

- a) Add source code to **define the `getRandomDayOfWeek()` function** that **generates a random number in the range of 1-7** (inclusive). [5 Marks]

- b) Modify the **`main()`** function to use a **switch statement** that displays the **name of the day of the week** based on value of the variable **`dayOfWeek`**, where **1 is Sunday** and **7 is Saturday**. [5 Marks]

## QUESTION 7

Consider the following source code. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary.

```
01: int main( void )
02: {
03:     int counter;
04:     float prices[ 20 ] = { 0.0 };
05: }
```

a) Add source code to **accept and store 20 input prices in the array.**

[4 Marks]

b) Add source code to **reduce each price in the array by 10. However, do not change the price if the reduced price would be zero or less.**

[6 Marks]

## QUESTION 8

Consider the following source code. Line numbers have been provided for reference. Indicate specific line numbers in your answers when necessary.

```
01: #include <stdio.h>
02:
03: int main( void )
04: {
05:     int counter = 100;
06:
07:     do
08:     {
09:         if ( ( counter + 5 * 4 - 2 ) > 0 ) printf( "%d ", counter );
10:         else printf( "%d ", counter * (-1) );
11:
12:         counter++;
13:     } while ( counter < 200 );
14: }
```

a) Describe the program output.

[5 Marks]

b) Modify the program to use a **for** loop instead of the **do/while** loop.

[5 Marks]

### QUESTION 9

- a) Place an "X" in the box next to **3 terms** that are most directly related to the use of **text strings** in a C program. [3 Marks]

<input type="checkbox"/>	scope
<input type="checkbox"/>	local
<input type="checkbox"/>	length
<input type="checkbox"/>	global
<input type="checkbox"/>	automatic

<input type="checkbox"/>	zero
<input type="checkbox"/>	char
<input type="checkbox"/>	array
<input type="checkbox"/>	binary
<input type="checkbox"/>	boundary

- b) Write a C program that **keeps asking for an input string until the length of the string is an even number**. Show or use all the terms selected in part (a). [7 Marks]

## QUESTION 10

Write a C program that **accepts 200 input integers** and displays the following output: **[10 Marks]**

- **Count** of **positive** input values
- **Subtotal** of all **positive** input values
- **Count** of **negative** input values
- **Subtotal** of all **negative** input values