

UNIVERSITY OF PORTSMOUTH

FACULTY OF TECHNOLOGY

Department of Electronic and Computer Engineering

B142L – Introduction to Computing

U13746

Date: July 2007

Time: 2 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.

Calculators permitted are:

Casio FX 85WA

Casio FX 83WA

Casio FX 85MS

Examiner:

Mr Chi Nguyen

Student ID Number

Consider the following source code to answer Question 1. Line numbers have been provided at the start of each line for reference. **Indicate specific line numbers** in your answers when necessary.

```
01: int main( void );
02: {
03:     char model[] = 'desktop';
04:     int price = 400.50;
05:     long quantity = "11";
06:
07:     printf( "There are %d %s computers on sale for %.2f each.",
quantity, price, model );
08: }
```

QUESTION 1. Modify the source code to correct all errors. [10 marks]

Consider the following source code to answer Question 2. Line numbers have been provided at the start of each line for reference. Indicate specific line numbers in your answers when necessary.

```
01: int main( void )
02: {
03:     int input = -100;
04:
05:     scanf( "%d", &input );
06:
07:     if ( input > 100 ) printf( "Orange" );
08:         else printf( "Apple" );
09:     if ( input < 200 ) printf( "Grape" );
10: }
```

QUESTION 2A. Describe all valid input values that would cause the following output to be displayed: [5 marks]
OrangeGrape

QUESTION 2B. List all valid program outputs. [5 marks]

QUESTION 3A. Place an “X” in the box next to 3 terms that are most directly related to the use of for loops in a C program. [3 marks]

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

selection
iteration
output
input
format

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

initialization
assignment
declaration
test condition
error condition

QUESTION 3B. Write a C program that uses a for loop to display all positive odd integers less than 700. Show or use in your program all of the terms you selected in Question 3A. [7 marks]

QUESTION 4. Write a C program that uses a while loop to collect integer inputs and ends when a zero value is entered. The program must display the minimum and maximum of all input values. [10 marks]

Consider the following source code to answer Question 5. Line numbers have been provided at the start of each line for reference. Indicate specific line numbers in your answers when necessary.

```
01: int main( void )
02: {
03:     int marks[ 5 ] = { 72, 54, 61, 49, 67, 69 }
04:     int count;
05:     for ( counter == 0; counter <= 6; counter++ )
06:     {
07:         if ( marks[ counter ] >= 70 ) { printf ( "A \n" ); continue; }
08:         if ( marks[ counter ] >= 60 ) { printf ( "B \n" ); continue; }
09:         if ( marks[ counter ] >= 50 ) { printf ( "C \n" ); continue; }
10:         if ( marks[ counter ] >= 40 ) { printf ( "D \n" ); continue; }
11:     }
12: }
```

QUESTION 5. Modify the source code to correct all errors. [10 marks]

Consider the following source code to answer Question 6. Line numbers have been provided at the start of each line for reference. **Indicate specific line numbers** in your answers when necessary.

```
01: #include <string.h>
02:
03: int main( void )
04: {
05:     char buffer[ 128 ] = { '\0' };
06:     int counter;
07:
08:     scanf( "%s", buffer );
09: }
```

QUESTION 6A. Modify the source code to **display a duplicate of each letter in the input buffer string**. For example, an input string “welcome” should be displayed as “wweellccoommee” on screen. [5 marks]

QUESTION 6B. Modify the source code to **display the input buffer string with all ‘b’ characters replaced with ‘B’ characters**. [5 marks]

QUESTION 7A. Place an “X” in the box next to 3 terms that are most directly related to the use of functions in a C program. [3 marks]

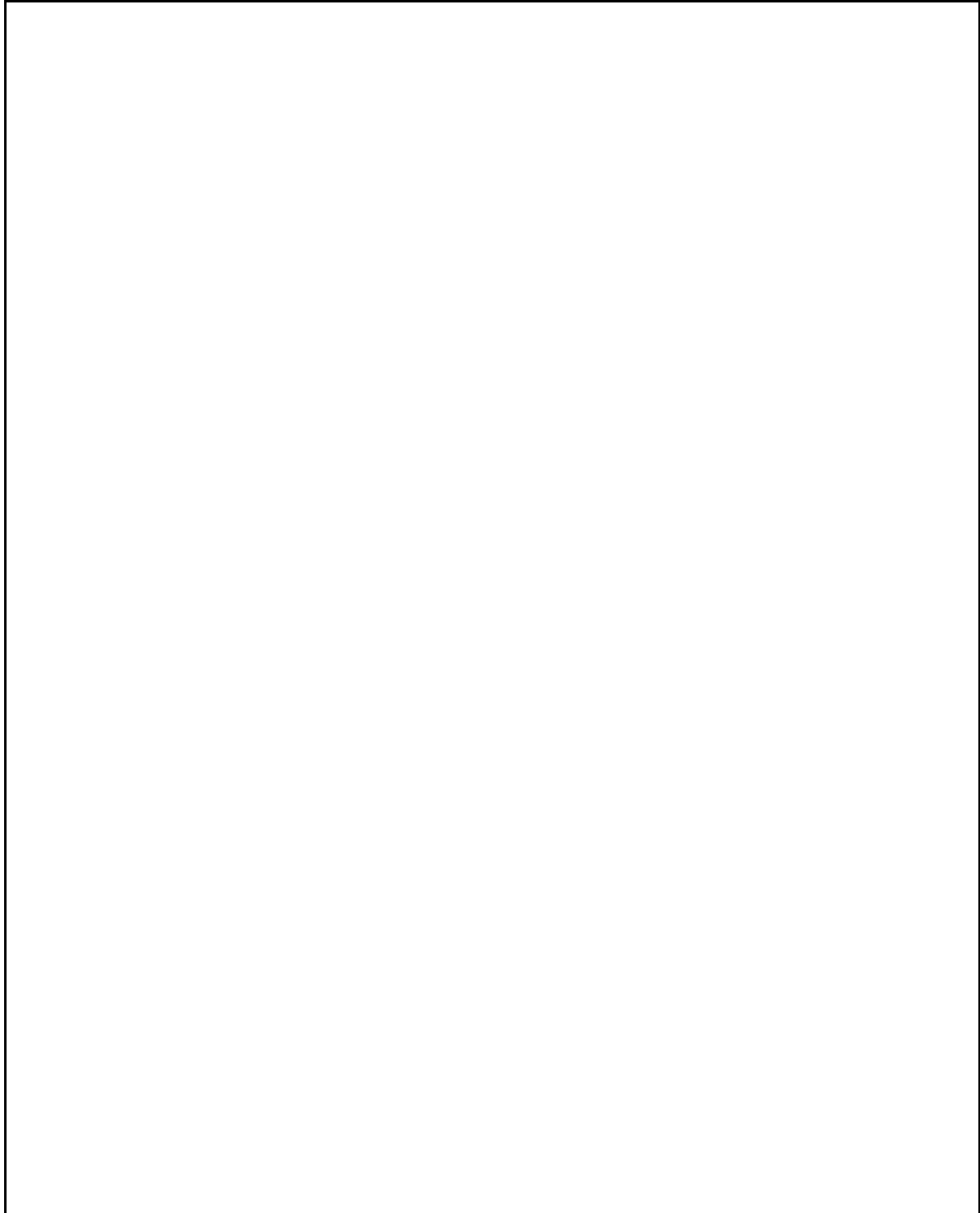
<input type="checkbox"/>	template	<input type="checkbox"/>	parameter
<input type="checkbox"/>	prototype	<input type="checkbox"/>	element
<input type="checkbox"/>	extern variable	<input type="checkbox"/>	member
<input type="checkbox"/>	local variable	<input type="checkbox"/>	default
<input type="checkbox"/>	global variable	<input type="checkbox"/>	break

QUESTION 7B. Write a C function that accepts two input values. If the input character is ‘C’, the function converts the input floating point number to Fahrenheit and returns that value. If the input character is ‘F’, the function converts the input floating point number to Celsius and returns that value. Show or use in your function all of the terms you selected in Question 7A. Use the formula below. [7 marks]

$$\text{Celsius} = 5 / 9 * (\text{Fahrenheit} - 32)$$

QUESTION 8. Write a C function that returns the number of times a specific character is found in a string. The first input value is the character to find and count. The second input value is a pointer to the string to be searched. The prototype is provided below. [10 marks]

```
int findCharacter( char, char* );
```



QUESTION 9A. Place an “X” in the box next to 3 terms that are most directly related to the use of data files in a C program. [3 marks]

<input type="checkbox"/>	data array	<input type="checkbox"/>	MODE_A
<input type="checkbox"/>	file array	<input type="checkbox"/>	MODE_R
<input type="checkbox"/>	file pointer	<input type="checkbox"/>	MODE_W
<input type="checkbox"/>	fopen()	<input type="checkbox"/>	END
<input type="checkbox"/>	close()	<input type="checkbox"/>	EOF

QUESTION 9B. Write a C program to read and display the integers in the data file until you find a -1 value or reach the end of file.

“C:/voltage.txt” is the file location. Show or use in your program all of the terms you selected in Question 9A. [7 marks]

Consider the following source code to answer Question 10. Line numbers have been provided at the start of each line for reference. **Indicate specific line numbers** in your answers when necessary.

```
01: #include <stdio.h>
02: #define FILENAME "C:/absolute.txt"
03:
04: int main( void )
05: {
06:     int output = 0;
07: }
```

QUESTION 10A. Modify the source code to accept integer inputs from the keyboard and write the values out to the data file. The program ends when a zero input value is entered. Use the file name provided in the source code for output. [7 marks]

QUESTION 10B. Modify the source code for Question 10A to replace all negative input numbers with their absolute value before writing to the data file. For example, an input value of -25 should be saved to file as number 25. [3 marks]