

# COMMONWEALTH OF AUSTRALIA

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Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2016

<b>FINAL EXAMINATION</b>	<b>DURATION</b>
<b>HIT237 – Building Interactive Software</b>	Reading Time: <b>10</b> minutes
	Writing Time: <b>180</b> minutes

**INSTRUCTIONS TO CANDIDATES**

**EXAM CONDITIONS**

**You may begin writing from the commencement of the examination session.** The reading time indicated above is provided as a guide only.

This is a RESTRICTED OPEN BOOK examination

No calculators are permitted

One A4 sheet of handwritten double-sided notes permitted

Hard copy, unannotated English translation dictionary only

<b>ADDITIONAL AUTHORISED MATERIALS</b>	<b>EXAMINATION MATERIALS TO BE SUPPLIED</b>
No additional printed material is permitted	1 x 20 Page Book

**THIS EXAMINATION IS PRINTED  
DOUBLE-SIDED.**

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## Question 1

What is the top most component of a GUI window and what method of that class is used to add other components to it?

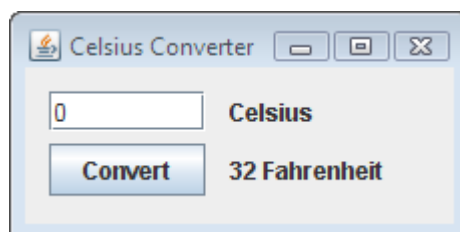
Exemplify writing a simple method that creates a window and adds a component to the window.

**Marks: 4**

## Question 2

Consider the figure below. There are 3 components (one input box one button and one label) on this interface.

1. Write the code that will draw all three components on the panel.
2. Add the listener to the button that is used to perform the calculation, the listener should use an anonymous class.
3. When Button is pressed temperature should be calculated using the following formula:  $1.8 \times T + 32$ , where T is the temperature in Celsius.
4. The result should be displayed in the label.
5. Program should check for invalid input and output an error message.



**Marks: 8**

### Question 3

Consider a file named *products.txt* with a comma separated list of values in the following order:

Name, Description, Price

Each row represents a product, and the first row contains the headers above.

Write the following program:

1. Create a class named Product that will represent each row of that file,
2. Write a program that will parse the file and loads an ArrayList of products.
3. Output the ArrayList to the console, displaying all the details about the loaded products.

**Marks: 8**

### Question 4

A palindrome is a word that reads the same backwards as forwards, e.g. madam.

Write a program that checks if a certain String is a palindrome.

**Marks: 5**

### Question 5

An application will establish a socket connection to a process on “contoso.com” using port 1058.

The client should send a message to the server. The message should be formatted “x+y” where x and y should be integer number, example of a valid message: “2+5”

The server should parse the request, calculate the result and respond to the client with the result, example: “7” , if the request is not valid, then the server should respond with the following message:”Invalid Request”

The client should then print out the server’s response, close the socket and clean up at the end.

Write both the client and the server code.

**Marks: 6**

### Question 6

Why would you use an *Hashtable* over an *HashMap*?

Describe in detail the problems that one solution resolves over the other.

**Marks: 4**

### Question 7

The following list of nodes are added to a classic implementation of a Binary Tree of type *int*.

[19,20,43,22,10,15,10,78]

Draw the resulting binary tree

**Marks: 4**

### Question 8

Consider the Tree and data from Question 7 [see above]. The recursive print method of the Node class is written as follows:

```
public void print(Node p) {  
    if (p != null) {  
        System.out.print(p.data + " ");  
        print(p.left);  
        print(p.right);  
    }  
}
```

Answer these questions:

1. What is the resulting output to the console when this method is called?
2. Explain this output.

**Marks: 5**

### Question 9

Write a multithreaded console application. One thread should output even numbers the the other thread should output odd numbers. Start the threads and put them to sleep, one of them at random intervals, the other every 1 second.

**Marks: 6**