TASMANIAN QUALIFICATIONS AUTHORITY

Tasmanian Certificate of Education

COMPUTER SCIENCE

Senior Secondary

Subject Code: ITC315108

External Assessment

2011

Part 1

Time: approximately 35 minutes

On the basis of your performance in this examination, the examiners will provide results on the following criterion taken from the course statement:

Criterion 1 Design and evaluate algorithmic solutions to a range of problems.

C1 Rating

Questions: 3
Pages: 16

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CANDIDATE INSTRUCTIONS

Candidates **MUST** ensure that they have addressed the externally assessed criterion on this examination paper.

Answer **ALL** questions. Answers must be written in the spaces provided on the examination paper.

You should make sure you answer all parts within each question so that the criterion can be assessed.

This examination is 3 hours in length. It is recommended that you spend approximately 35 minutes in total answering the questions in this booklet.

All written responses must be in English.

To be considered for a 'C' rating on a criterion, you must provide a satisfactory answer to at least the first question of the relevant section.

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You should show the methods used in deriving answers.

You should take care with the presentation of your answers, which should be complete and to the point. Diagrams should be used where appropriate. Complete sentences should be used in questions involving explanations. You are reminded that poor handwriting, spelling and expression that make it difficult for the examiners to understand what you mean may lead to lower marks.

Question 1

The following is a ***partially completed*** algorithm for an applet designed to calculate the number of kilograms of CO_2 produced by travelling a given distance in kilometres. The applet will do the calculation for a car, train and plane. In the case of a car the user can indicate the number of passengers.

The numbers on the left of the algorithm are provided for reference purposes.

```
1   Initially
2       distance = 100
3       passengers = 1

4   When a number is entered into "distance" TextField
5       Set distance to value in "distance" TextField
6       Display "Travel distance is " distance

7   When a number is entered into "passengers" TextField
8       Set passengers to value in "passengers" TextField
9       Display "Number of passengers is " passengers

10  When the "Calculate" button is pressed
11      car = 0.128 * distance / passengers
12      train = 0.0534 * distance
13      plane = 0.171 * distance
14      Display "CO2 usage by car " car "kg"
15      Display "CO2 usage by train " train "kg"
16      Display "CO2 usage by plane " plane "kg"
```

Change the algorithm so that it includes the following features. Using the line numbers provided, indicate the necessary changes to the algorithm so that features work correctly.

Features of the program

- The distance entered for the calculation must be up to 2000 km. If a number larger than 2000 is entered then the distance should be set to 2000.

- The maximum number of passengers that can be entered for the car is 5. If a number larger than 5 is entered then passengers should be set to 1.

- The CO_2 usage for the plane should only be displayed if the distance travelled is greater than 150 km.

Question 1 continues opposite.

Question 1 (continued)

For Marker Use Only

1 ***Initially***
2 distance = 100
3 passengers = 1

4 ***When a number is entered into "distance" TextField***
5 Set distance to value in "distance" TextField

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7 ***When a number is entered into "passengers" TextField***
8 Set passengers to value in "passengers" TextField

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10 ***When the "Calculate" button is pressed***

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Question 2

The following is a ***partially completed*** algorithm for an applet to be used to calculate the score for a dice rolling game. The player rolls one dice 10 times and the score is the sum of all the dice rolls. If the player rolls the same number twice in a row (e.g. a 4 followed by a 4) then the next roll will be worth double its value (e.g. roll a 3 and it will be worth 6). Below is an example of the scoring in a game.

Roll	3	6	4	4	3	5	2	3	6	1
Score	3	9	13	17	23	28	30	33	39	40

The user will enter into the applet the value of the dice roll. The applet will then calculate the score after each roll.

The numbers on the left of the algorithm are provided for reference purposes.

```
1   Initially
2       roll = 0
3       last_roll = -1
4       second_last_roll = -2
5       score = 0
6       count = 0

7   When a number is entered into "roll" TextField
8       Set roll to value in "roll" TextField
9       if  roll > 6 or roll < 1
10          roll = 0
11      Display  "Roll is " roll

12  When the "Calculate" button is pressed
13      if  (count < 10)
14          if  second_last_roll = last_roll
15              score = score + roll * 2
16          else
17              score = score + roll

18          Display  "Score is " score
19          count = count + 1
```

Question 2 continues opposite.

Question 2 (continued)

(a) Each time the calculation is done the **second_last_roll** needs to be given the value of the **last_roll** and the **last_roll** needs to be given the value of the **roll**. The algorithm does not do this. Add this to the algorithm.

(b) If the last two rolls have the same value (that is the 9th and 10th rolls) then the player is given an extra roll so that the double score can be added. In the example below, the extra roll (shaded) is doubled and added to the score.

Roll	3	6	4	4	3	5	2	3	6	6	3
Score	3	9	13	17	23	28	30	33	39	40	46

Add this feature to the algorithm.

Question 2 continues over the page.

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Question 2 (continued)

For Marker Use Only

```
1    Initially
2        roll = 0
3        last_roll = -1
4        second_last_roll = -2
5        score = 0
6        count = 0

7    When a number is entered into "roll" TextField
8        Set roll to value in "roll" TextField
9        if  roll > 6 or roll < 1
10           roll = 0
11       Display  "Roll is " roll

12   When the "Calculate" button is pressed
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Question 3

An applet is needed by those trying to lose weight to keep track of the number of kilojoules involved in the required weight loss. First the applet will need to find out from the user how much weight is to be lost and in how many months. The number of kilojoules to lose per day will be calculated using the formula:

*kilojoules to lose = 1167 * weight loss / months*

The user then has two options:

1. The user can enter the number of **kilojoules to lose by food reduction** and the applet will then calculate the kilojoules to lose by walking and the number of kilometres to walk using the formulae:

   kilojoules by walking = kilojoules to lose – kilojoules by food
   kilometres to walk = kilojoules by walking / 326

2. The user can enter the number of **kilometres to walk** and the applet will then calculate the kilojoules to lose by walking and kilojoules to lose by food reduction using the formulae:

   *kilojoules by walking = kilometres to walk * 326*
   kilojoules by food = kilojoules to lose – kilojoules by walking

Write an algorithm for this applet that uses the Initially/When model. In addition to displaying all the values calculated in the description above, the algorithm should handle the following conditions:

- If the number entered for *kilojoules by food* is greater than the *kilojoules to lose* then *kilojoules by walking* should be set to zero and the *kilojoules by food* should become equal to the *kilojoules to lose*.

- Your applet should work correctly no matter what order the data is entered into the textfields. For example, it should prevent a division by zero months in the *kilojoules to lose* formula.

Note: Use appropriate variable names and assume that all data entered are numbers.

Question 3 continues opposite.

Question 3 (continued)

For Marker Use Only

Question 3 continues over the page.

Question 3 (continued)

For Marker Use Only

Spare Answer Sheet if Required

Question Number: _____

(In the box write the number of the question you have answered.)

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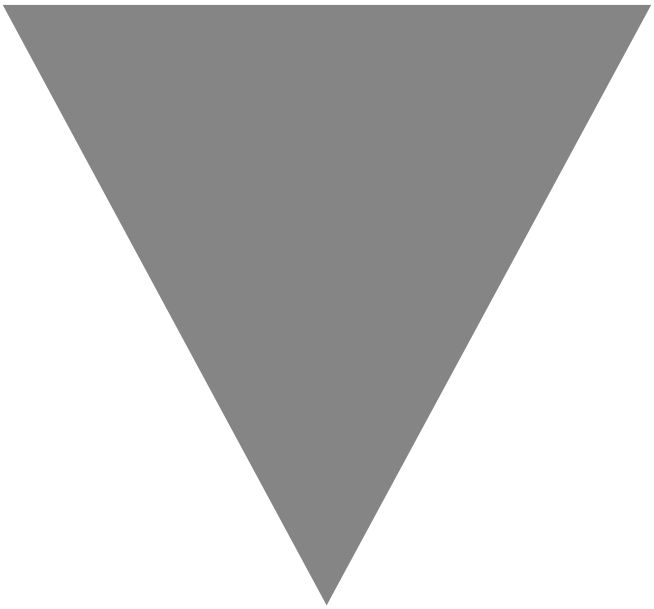

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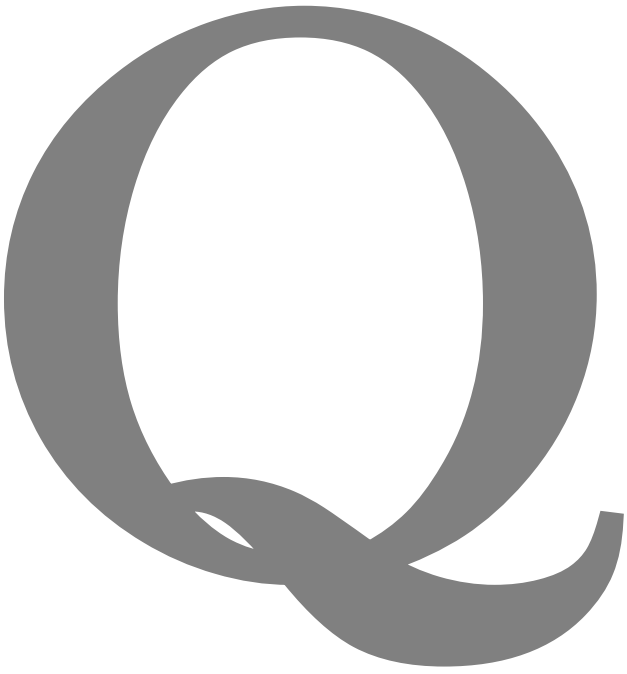

TASMANIAN QUALIFICATIONS AUTHORITY

Tasmanian Certificate of Education

COMPUTER SCIENCE

Senior Secondary

Subject Code: ITC315108

External Assessment

2011

Part 2

Time: approximately 35 minutes

On the basis of your performance in this examination, the examiners will provide results on the following criterion taken from the course statement:

Criterion 2 Demonstrate knowledge of a high level programming language.

C2 Rating

Questions: 3
Pages: 16

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CANDIDATE INSTRUCTIONS

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Question 4

(a) What will be the value of ***s*** after the following code is executed?

```
int v = 100;
int s = 1;
if (v == 1)
{
    s = s + 100;
}
else
{
    s = s + 50;
}
```

(b) What will be the value of ***c*** after the following code is executed?

```
int c = 0;
for(int i = 1; i <= 5; i++)
{
    if (i == 1 || i == 5)
    {
        c = c + 1;
    }
}
```

(c) List all the possible values of ***x*** when the following code is executed.

```
int x =(int)(Math.random()*6+1);
```

Question 4 continues opposite.

Question 4 (continued)

For Marker Use Only

(a) Show working here:

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Find value of *s*:

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(b) Show working here:

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Find value of *c*:

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(c) Show working here:

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Possible values of *x*:

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Section B (continued)

Question 5

(a) Explain in detail why the final value of ***place*** is 4 when the following code is executed.

```
char keep = 'D';
int place = (int)keep - (int)'A' + 1;
```

(b) Declare and initialise the variables ***a***, ***b*** and ***c*** appropriately for use as the actual parameters for the following method. Then write the code that will correctly call the method.

```
public boolean partb(double x, double y, double z)
{
    return Math.abs(x * x + y * y  - z * z) < 0.001
}
```

(c) ***play*** is an int[6] array holding the following values:

index	*0*	*1*	*2*	*3*	*4*	*5*
value	0	2	4	2	4	4

Trace the following code and find the final value of the variable ***mult***.

```
int place = 5;
int mult = 0;
for(int i=1; i<=5; i++)
    if (play[i] == play[place])
            mult = mult + 1;
```

A trace table like the one shown below should be used to show the trace.

place	*mult*	*i*	*play[i]*	*play[place]*
5				

Question 5 continues opposite.

Question 5 (continued)

For Marker Use Only

(a) Show working here:

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Find value of ***place***:

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(b) Declare and initialise ***a, b*** **and** ***c***:

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Code to call the method:

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Question 5 continues over the page.

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Question 5 (continued)

For Marker Use Only

(c) Trace Table:

place	*mult*	*i*	*play[i]*	*play[place]*
5				

Explanation:

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Find value of ***mult***:

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Section B (continued)

Question 6

This question relates to the following program. The numbers on the left are not part of the program and are provided for reference purposes.

(a) In the method ***scoring,*** changing ***score*** does not update the global ***score***. Give two ways of fixing this problem and show the necessary changes to the code.

(b) The contents of the array ***play*** at the end of ***paint*** method determine the final value of variable ***stop***. Under what conditions will ***stop*** have the value ***true*** at the end of the ***paint*** method?

```
1    import java.awt.*;
2    import java.applet.Applet;
3    import java.awt.event.*;

4    public class Question6 extends Applet implements ActionListener
5    {
6       int[]        play;
7       int          place, score;
8       Label        keepLabel;
9       TextField    keepField;
10      Button       finishButton;
11      char         keep;
12      boolean      finish, stop;

13      public void init()
14      {
15         play = new int[6];
16         for(int i=1; i<=5; i++)
17            play[i] = 1;

18         keepLabel = new Label("Die to keep: ");
19         keepField = new TextField(1);
20         finishButton = new Button("Finish");
21         add(keepLabel);
22         add(keepField);
23         add(finishButton);

24         keepField.addActionListener(this);
25         finishButton.addActionListener(this);

26         keep = ' ';
27         finish = true;
28         score = 0;
29         stop = false;
30      }

31      public void scoring(int[] play, int place, int value, int score)
32      {
33         if (play[place]==value)
34         {
35            play[place]=0;
36            if (value == 1)
37               score = score + 100;
38            else
39               score = score + 50;
40         }
41      }
```

Section B continues opposite.

Section B (continued)

```
42      public void paint(Graphics g)
43      {
44         if (finish && !stop)
45         {
46            stop = true;
47            for(int i=1; i<=5; i++)
48               if (play[i] != 0)
49               {
50                  play[i]=(int)(Math.random()*6+1);
51                  if (play[i] == 1 || play[i] == 5)
52                     stop = false;
53               }
54            finish = false;
55         }
56         if (stop)
57            g.drawString("Game over your score is: "+score,40,190);
58         else
59         {
60            g.drawString("A    B    C    D    E",40,70);
61            for(int i=1; i<=5; i++)
62               if (play[i] != 0)
63                  g.drawString(""+play[i],20+i*20,100);
64         }
65      }

66      public void actionPerformed(ActionEvent e)
67      {
68         if (e.getSource() == finishButton)
69            finish = true;
70         if (e.getSource() == keepField)
71         {
72            if (!stop)
73            {
74               keep = keepField.getText().toUpperCase().charAt(0);
75               place = (int)keep - (int)'A' + 1;
76               if (play[place]!= 0)
77               {
78                  int mult = 0;
79                  for(int i=1; i<=5; i++)
80                        if (play[i] == play[place])
81                           mult = mult + 1;
82                  if (mult>=3)
83                  {
84                     int multNo = play[place];
85                     mult = 3;
86                     for(int i=1; i<=5; i++)
87                        if (mult > 0 && play[i] == multNo)
88                        {
89                              play[i]=0;
90                              mult--;
91                        }
92                     score = score + multNo * 100;
93                  }
94                  else
95                  {
96                     scoring(play, place, 1, score);
97                     scoring(play, place, 5, score);
98                  }
99               }
100              keepField.setText("");
101           }
102        }
103        repaint();
104     }
105  }
```

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Question 6 (continued)

For Marker Use Only

Answers to parts (a) and (b).

For Marker Use Only

Spare Answer Sheet if Required

Question Number: ____

(In the box write the number of the question you have answered.)

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Spare Answer Sheet if Required

Question Number: _____

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For Marker Use Only

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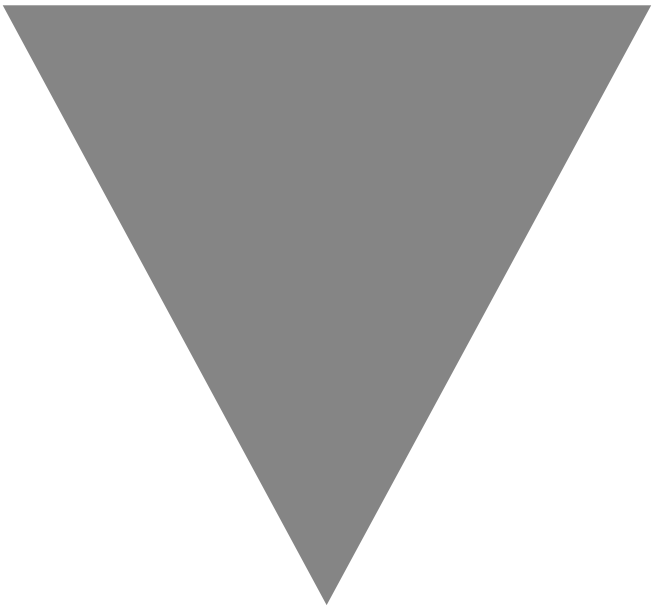

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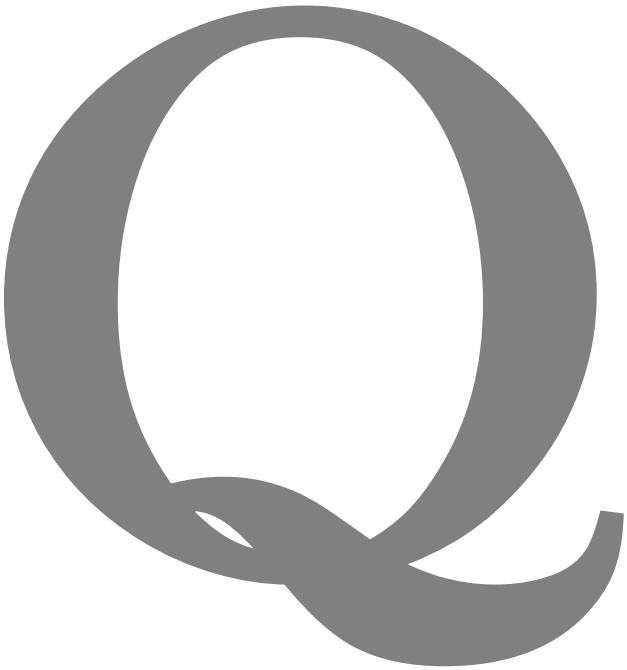

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COMPUTER SCIENCE

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External Assessment

2011

Part 3

Time: approximately 35 minutes

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Criterion 3 Use appropriate objects in the design of programs.

C3 Rating

Questions: 3
Pages: 16

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CANDIDATE INSTRUCTIONS

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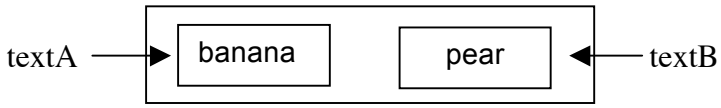
Question 7

The following diagram shows an applet window with two text fields (textA, textB).

The ActionListener has been added to textA and textB.



The ***actionPerformed*** method for the applet is as follows:

```
public void actionPerformed(ActionEvent e)
{
    if (e.getSource() == textA)
    {
        String  hold1 = "", hold2 = "";
        hold1 = textA.getText();
        hold2 = textB.getText();
        textA.setText(hold2);
        textB.setText(hold1);
    }

    if (e.getSource() == textB)
    {
        textA.setText(textB.getText().toUpperCase());
    }
}
```

Assume that the values stored in the text fields are as shown in the diagram. What will be displayed in **both** text fields after each of the following actions is executed in ***sequence***?

(a) The user enters “apple” into textA.

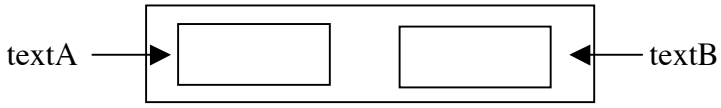
(b) The user enters “grape” into textB.

Question 7 continues opposite.

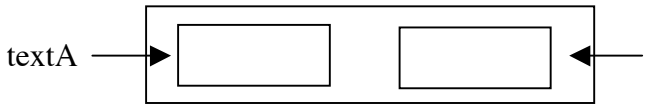
Question 7 (continued)

For Marker Use Only

(a) Indicate what will be displayed in all text fields



(b) Indicate what will be displayed in all text fields.



Question 8

(a) Show the value of the variable ***string3*** each time it changes during the following section of code.

```
String string1 = "FaceBook";
String string2 = "Mark";
String string3 = "";
string3 = string1.substring(4,string1.length());
string3 = string3 + string2.toLowerCase();
```

(b) Using this description of the Rectangle object draw the applet window after each **g.drawRect**() method call in the code below.

Field Summary		
int	**height**	The height of the Rectangle.
int	**width**	The width of the Rectangle.
int	**x**	The *x* coordinate of the top-left corner of the Rectangle.
int	**y**	The *y* coordinate of the top-left corner of the Rectangle.
Constructor		
Rectangle() Constructs a Rectangle whose top-left corner is at (0, 0) and whose width and height are both zero.		
Methods		
void	**setBounds**(int x, int y, int width, int height) Sets the bounds of this Rectangle to the specified x, y, width, and height.	
void	**setBounds**(Rectangle r) Sets the bounds of this Rectangle to match the specified Rectangle.	
void	**translate**(int x, int y) Moves the Rectangle the indicated distance, to the right along the x coordinate axis, and downward along the y coordinate axis.	
Rectangle	**union**(Rectangle r) Sets the bounds of this Rectangle to the union of this Rectangle with the specified Rectangle. That is the smallest Rectangle containing both the specified Rectangle and this Rectangle.	

```
Rectangle square1 = new Rectangle();
Rectangle square2 = new Rectangle();
Rectangle square3 = new Rectangle();
square1.setBounds(50,50,100,100);
g.drawRect(square1.x,square1.y,square1.width, square1.height);

square2.setBounds(square1);
square2.translate(100,100);
g.drawRect(square2.x,square2.y,square2.width, square2.height);

square3 = square1.union(square2);
g.drawRect(square3.x,square3.y,square3.width, square3.height);
```

Question 8 continues opposite.

Question 8 (continued)

For Marker Use Only

(a) First value of ***string3***:

.....

Second value of ***string3:***

.....

.....

Third value of ***string3***:

.....

Question 8 continues over the page.

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Question 8 (continued)

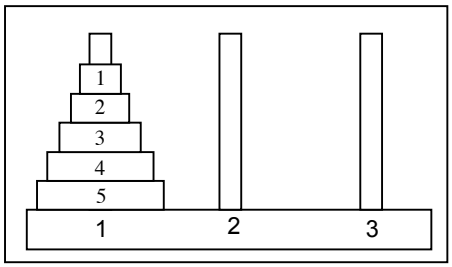
For Marker Use Only

(b) (i) First call of ***g.drawRect:***

(ii) Second call of ***g.drawRect***:

(iii) Third call of ***g.drawRect***:

Question 9



The class definition below defines the rules for the Towers of Hanoi. There are 3 towers and 5 discs that can be moved from tower to tower according to these rules.

```
public class Towers
{
     public    int[][]       tower = new int[4][6];
     public    int           moves;
     public Towers()
     {
          moves = 0;
          for(int i = 1; i<=5; i++)
          {
               tower[1][i] = 6 - i;
               tower[2][i] = 0;
               tower[3][i] = 0;
          }
     }
     public boolean checkFrom(int from)
     {
          if (tower[from][1] == 0)
               return false;
          else
               return true;
     }
     public boolean move(int from, int to)
     {
          int i = 5;
          while (tower[from][i] == 0)
               i=i-1;
          int j = 1;
          int previous = 6;
          while (tower[to][j] != 0)
          {
               previous = tower[to][j];
               j=j+1;
          }
          if (tower[from][i] < previous)
          {
               tower[to][j] = tower[from][i];
               tower[from][i] = 0;
               moves = moves + 1;
               return true;
          }
          else
               return false;
     }
}
```

(a) Using the class definition write code to declare, instantiate and initialise a variable of the object type defined by the class.

(b) Using the methods **checkFrom**() and **move**() and the variable from part (a) move a disc from tower 2 to tower 3 after using **checkFrom**() to check if the move is possible.

(c) If the variable **moves** was changed from **public** to **private** write a method that would need to be added to the class in order to access the value of **moves**.

Question 9 continues opposite.

Question 9 (continued)

For Marker Use Only

Spare Answer Sheet if Required

For Marker Use Only

Question Number: ____

(In the box write the number of the question you have answered.)

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Question Number: _____

(In the box write the number of the question you have answered.)

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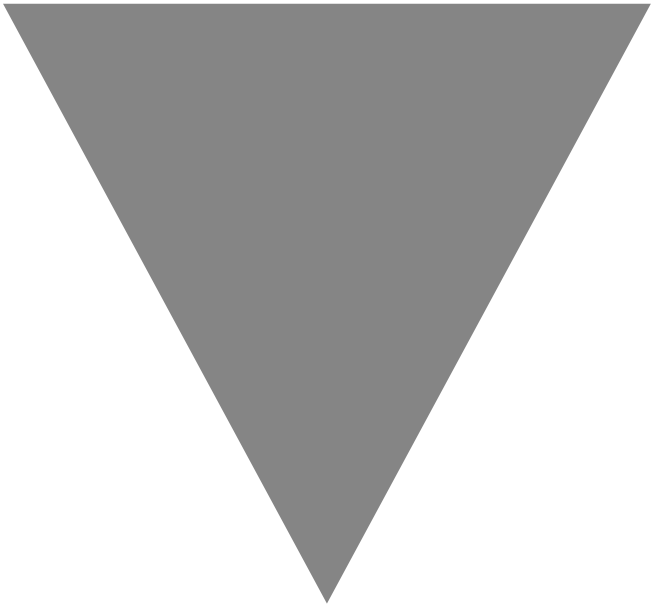

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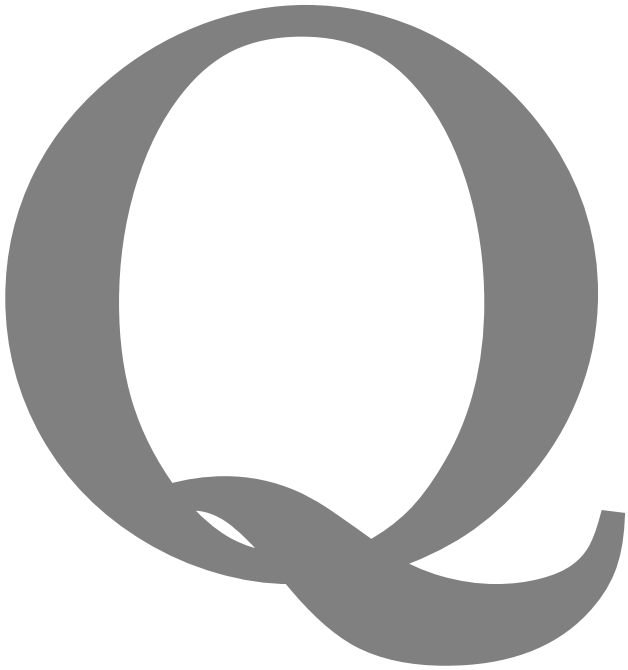

TASMANIAN QUALIFICATIONS AUTHORITY

Tasmanian Certificate of Education

COMPUTER SCIENCE

Senior Secondary

Subject Code: ITC315108

External Assessment

2011

Part 4

Time: approximately 35 minutes

On the basis of your performance in this examination, the examiners will provide results on the following criterion taken from the course statement:

Criterion 4 Demonstrate knowledge and understanding of computer architecture.

C4 Rating

Questions: 3
Pages: 12

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CANDIDATE INSTRUCTIONS

Candidates **MUST** ensure that they have addressed the externally assessed criterion on this examination paper.

Answer **ALL** questions. Answers must be written in the spaces provided on the examination paper.

You should make sure you answer all parts within each question so that the criterion can be assessed.

This examination is 3 hours in length. It is recommended that you spend approximately 35 minutes in total answering the questions in this booklet.

All written responses must be in English.

To be considered for a 'C' rating on a criterion, you must provide a satisfactory answer to at least the first question of the relevant section.

To be considered for a 'B' rating on a criterion, you must provide a satisfactory answer to at least the first two questions of the relevant section.

To be considered for an 'A' rating on a criterion, you must provide a satisfactory answer to all three questions of the relevant section.

You should show the methods used in deriving answers.

You should take care with the presentation of your answers, which should be complete and to the point. Diagrams should be used where appropriate. Complete sentences should be used in questions involving explanations. You are reminded that poor handwriting, spelling and expression that make it difficult for the examiners to understand what you mean may lead to lower marks.

Question 10

(a) (i) Use the binary to decimal conversion calculation to explain why $110_2 = 6_{10}$.

(ii) Copy this binary addition into your answer booklet and fill in the three missing bits.

	1	0	0		1
+		0	0	1	
	1		1	1	0

(b) A computer has an 8 bit word and uses two's complement representation for integers (the most significant bit is on the left). How do you know that the following word represents a negative number? Show the process used to work out what decimal number is represented by the word.

11101001

(c) 0.5 can be exactly represented by the binary fraction 0.1_2. By converting 0.6 to a binary fraction show that it cannot be represented exactly by a binary fraction.

Question 10 continues opposite.

Question 10 (continued)

For Marker Use Only

(a) (i) Convert $110_2 = 6_{10}$

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(ii)

	1	0	0		1
+		0	0	1	
	1		1	1	0

(b) Find decimal value of 111101001.

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Explain how you know the value is negative.

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(c) Convert 0.6 to a binary fraction.

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Explain why it is not exact.

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Question 11

(a) The following truth table shows the relationship between three input variables (P, Q, R) and the output variable (X).

(i) Write the simplest expression for the truth table marked as (A).

(ii) Write the simplest expression for the truth table marked as (B).

(iii) Use the expressions from (i) and (ii) to create an expression for truth table marked as (C). Then simplify this expression using one logic law. (State the law.)

(A)

P	Q	R	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

(B)

P	Q	R	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

(C)

P	Q	R	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

(b) The following table contains a TOY machine code segment that implements an **if statement nested in an if statement**. Write the java code, including the **if statement** structure, that is the equivalent of this machine code. Use the variable names indicated in the **Explanation** column of the table.

Memory Address	Contents	Pseudocode	Explanation
00	0001	data	The variable **a**
01	0000	data	The variable **b**
10	8A00	R[A] ← mem[00]	Set Register A to the contents of location 00
11	7101	R[1] ← 01	Set Register 1 to the number 1
12	2CA1	R[C] ← R[A] – R[1]	Register C = Register A – Register 1
13	DC16	if R[C] == 0 pc ← 16	Branch to address 16 if Register C = 0
14	7D20	R[D] ← 20	Set Register D to the number 20
15	ED00	pc ← R[D]	Jump to location 20
16	7303	R[3] ← 03	Set Register 3 to the number 3
17	9301	mem[00] ← R[3]	Store Register 3 in location 00
18	7202	R[2] ← 02	Set Register 2 to the number 2
19	8B01	R[B] ← mem[01]	Set Register B to the contents of location 01
1A	2CB2	R[C] ← R[B] – R[2]	Register C = Register B – Register 2
1B	DC1E	if R[C] == 0 pc ← 1E	Branch to address 1E if Register C = 0
1C	7D20	R[D] ← 20	Set Register D to the number 20
1D	ED00	pc ← R[D]	Jump to location 20
1E	7000	R[0] ← 00	Set Register 0 to the number 0
1F	9000	mem[00] ← R[0]	Store Register 0 in location 00
20	0000	exit	End of program.

Question 11 continues opposite.

Question 11 (continued)

For Marker Use Only

(a) (i) Expression for ***X*** from table (A).

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(ii) Expression for ***X*** from table (B).

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(iii) Expression for ***X*** from table (C).

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(b)
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int a = 0;
int b = 0;
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Question 12

Answer EITHER Part (a) OR Part (b) of this question, but NOT both.

(a) In image files RGB colours are also called RGB channels. The reason for this is that there is an optional fourth channel a pixel can have, namely its alpha channel.

The alpha channel is used to represent transparency. Not all digital images have transparency information. In cases where they don't, if you were to layer such an image over another image, it would obscure the one underneath as it is completely opaque. This is known as a plain RGB image.

Two commonly encountered file types with transparency are: TIFF and GIF.

With TIFF images each channel/colour has 256 possible shades. The same will apply to the alpha channel. It too will have 256 shades from 0 = transparent, to 255 = opaque. The shades in between are degrees of transparency.

GIF images can have up to 256 colours. They are unique in that they only have two states for the GIF's alpha channel, on or off; that is, totally transparent or totally opaque.

Calculate the number of bits of data required to store a 240 x 320 pixel image as:

(i) A plain TIFF file

(ii) A TIFF file with an Alpha Channel

(iii) A plain GIF file

(iv) A GIF file with an Alpha Channel

Note: Files have other information such as headers and colour palettes. Also file types have compression techniques to reduce storage requirements. These factors are to be ignored in the above calculations.

OR

(b) Below are two sections of code (Code A and Code B). Both sections of code have the same number of instructions and both are designed to swap two values. However, one section of code will operate much faster that the other. Explain why this is the case and also explain why this is an example of the Von Neumann bottleneck.

Code A		**Code B**	
(Load)	R[A] ← mem[00]	(Set value)	R[3] ← 0
(Load)	R[B] ← mem[01]	(Add)	R[A] ← R[0] + R[3]
(Store)	mem[00] ← R[B]	(Add)	R[0] ← R[1] + R[3]
(Store)	mem[01] ← R[A]	(Add)	R[1] ← R[A] + R[3]

Question 12 continues opposite.

Question 12 (continued)

For Marker Use Only

Spare Answer Sheet if Required

For Marker Use Only

Question Number: ____

(In the box write the number of the question you have answered.)

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Question Number: _____

(In the box write the number of the question you have answered.)

For Marker Use Only

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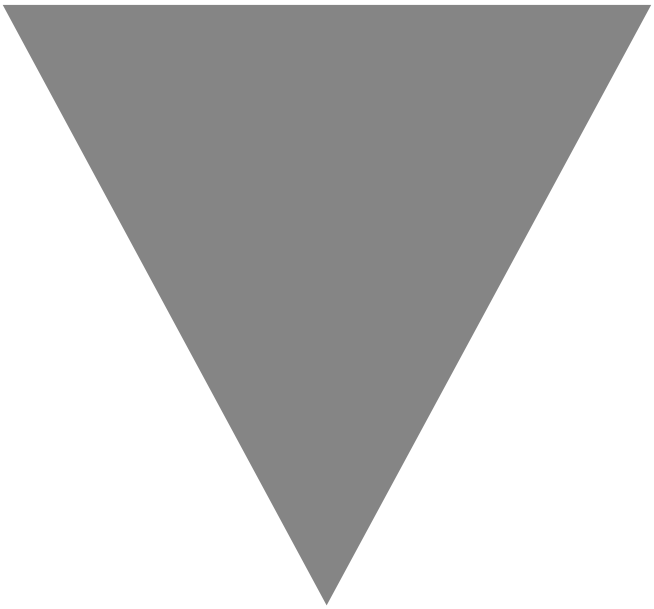

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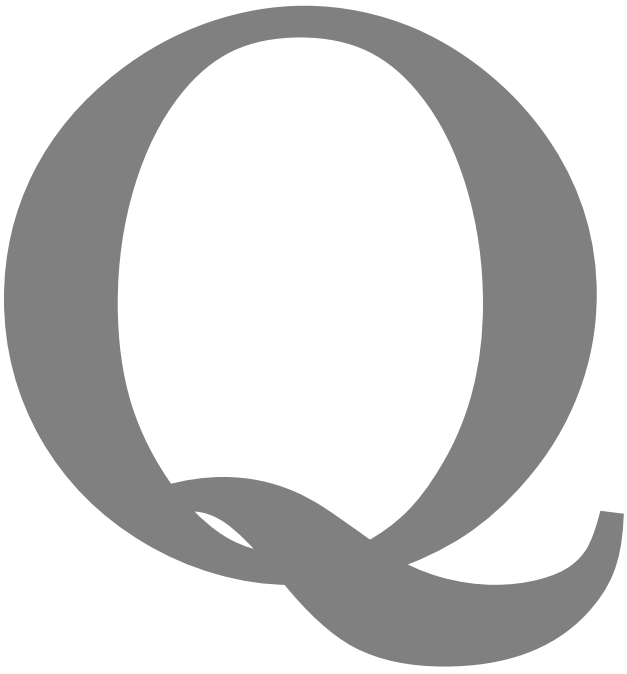

TASMANIAN QUALIFICATIONS AUTHORITY

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External Assessment

2011

Part 5

Time: approximately 35 minutes

On the basis of your performance in this examination, the examiners will provide results on the following criterion taken from the course statement:

Criterion 5 Design and evaluate networking solutions to small scale networks.

C5 Rating

Questions: 3
Pages: 16

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CANDIDATE INSTRUCTIONS

Candidates **MUST** ensure that they have addressed the externally assessed criterion on this examination paper.

Answer **ALL** questions. Answers must be written in the spaces provided on the examination paper.

You should make sure you answer all parts within each question so that the criterion can be assessed.

This examination is 3 hours in length. It is recommended that you spend approximately 35 minutes in total answering the questions in this booklet.

All written responses must be in English.

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You should show the methods used in deriving answers.

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Question 13

(a) At the TCP/UDP transport layer of the network protocols the higher level protocols are given port numbers. Give three examples of higher level protocols that have TCP/UDP port numbers and briefly describe the purpose of each protocol.

(b) Explain how WPA on a local Wi-Fi network makes sure that access is only given to authorised users.

(c) Compare the advantages and disadvantages of installing a wired LAN against installing a wireless LAN in a home.

Question 13 continues opposite.

Question 13 (continued)

For Marker Use Only

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(b)

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(c)

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Question 14

(a) Explain the difference between a firewall set up with a white listing and a black listing. Which option is more expensive to operate? Why?

(b) What are two features of a LAN that can impact on the speed of transmission in the network? Use examples in your answer.

Question 14 continues opposite.

Question 14 (continued)

For Marker Use Only

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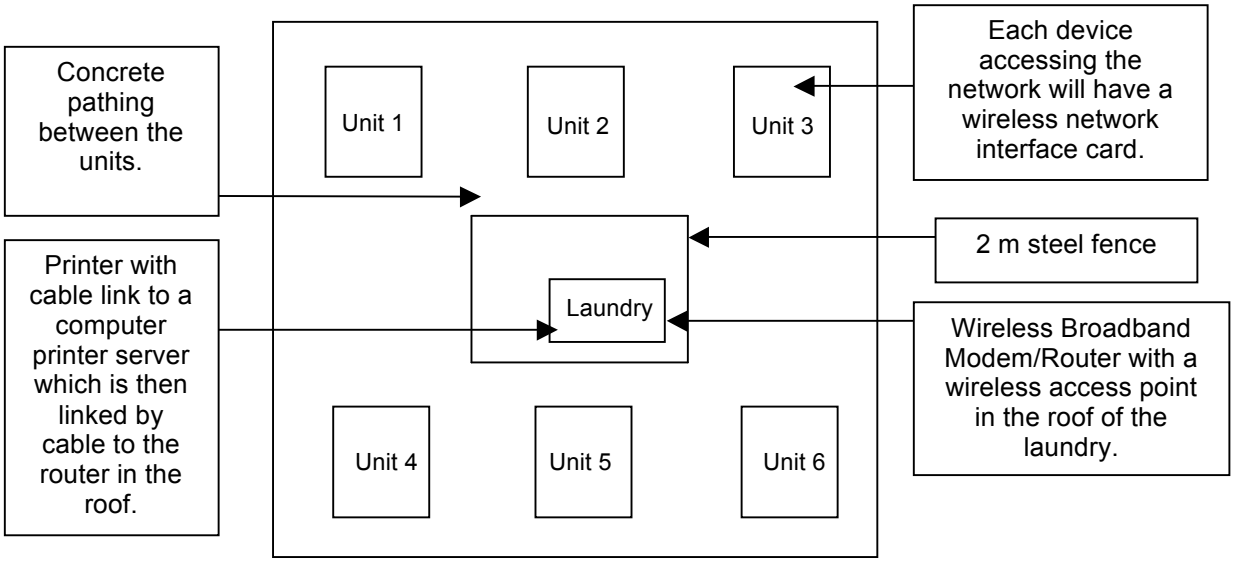
Question 15

As a guide your answer to this question should be no longer than half a page.

The owners of a set of units would like to share a single ISP link. The set of 6 units have been built on a roughly square property about 35 m across. The design includes a central laundry/meeting room. Around the laundry is a lawn area with washing lines and a children's playground. For privacy and safety of the children this area is fenced with a 2 m high steel fence. Around the units most of the area is covered in concrete to allow for parking. While the laundry obviously has a power connection it has no phone or network connection. All of the units have phone lines, although not all of them are used. All units and the laundry have been constructed from the same materials. They have brick walls and clay tiled roofs.

There is a concern that some of the unit owners may not wish to join the group and so they need to restrict access to the ISP link to those who are paying. They would like to have internet access in each of their units, as well as in the laundry/meeting room where they would like to take their laptops. They are also considering a central printing facility in the meeting room to save the cost of individual printers.

The following is a diagram of a possible network solution and the equipment used:



(a) Justify the selection and positioning of each piece of equipment using reasons based on this particular situation and the limitations of the equipment.

(b) Explain how the system will operate. Ensure that you base your explanation on this particular situation and consider any issues the users may have. You can make changes to the design but ensure that you justify your changes.

Question 15 continues opposite.

Question 15 (continued)

For Marker Use Only

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Question 15 continues over the page.

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Question 15 (continued)

For Marker Use Only

Spare Answer Sheet if Required

For Marker Use Only

Question Number: ____

(In the box write the number of the question you have answered.)

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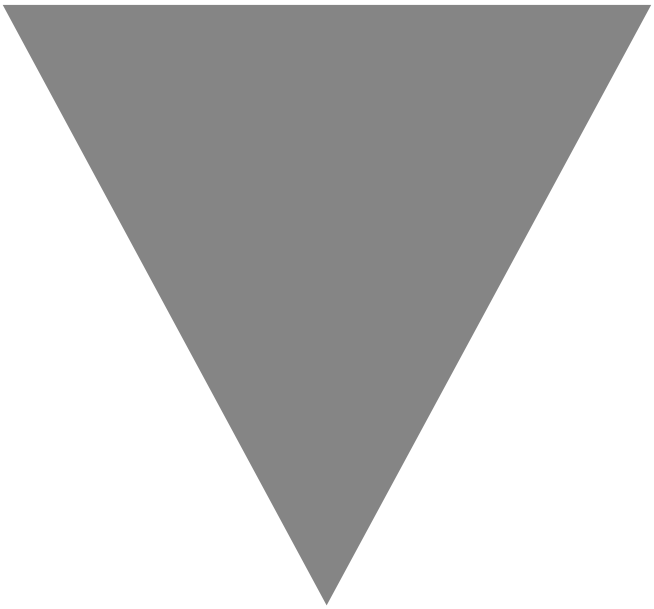

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