OFFICE OF TASMANIAN ASSESSMENT, STANDARDS & CERTIFICATION

Tasmanian Certificate of Education
External Assessment 2016

PLACE YOUR CANDIDATE LABEL HERE

COMPUTER SCIENCE

(ITC315113)

SECTION A

Time: 36 minutes

Pages:	12
Questions:	3
Attachments:	Information Booklet

Candidate Instructions

1. You **MUST** make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.
2. Answer **ALL** questions. Answers must be written in the spaces provided on the examination paper.
3. You should make sure you answer all parts within each question so that the criterion can be assessed.
4. This examination is 3 hours in length. It is recommended that you spend approximately 36 minutes in total answering the questions in this booklet.
5. The 2016 External Examination Information Booklet for Computer Science can be used throughout the examination.
6. All written responses must be in English.

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

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

Additional Instructions for Candidates

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.

Show the methods used in deriving answers.

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.

A spare answer sheet has been provided in the back of the answer booklet for you to use if required.

If you use a spare answer sheet, you MUST indicate you have done so in your answer to that question.

BLANK PAGE

Question 1

For Marker Use Only

The following is a ***partially completed*** algorithm to work out the amount of each ingredient required for making pancakes. The user enters the number of pancakes and the algorithm calculates the amount of each ingredient required to make that number of pancakes. The minimum number of pancakes that can be entered is five.

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

```
1     Initially
2         set pancakes = 5
3         set flour = 170
4         set eggs = 1
5         set milk = 60

6     When a number is entered into the "Number of pancakes?" Textfield
7         set pancakes to value in "Number of pancakes?" TextField
8         if pancakes less than 5
9             set pancakes = 5
10        display pancakes

11    When the "Calculate" button is pressed
12        set flour = pancakes * 34
13        set milk = pancakes * 12
14        if pancakes less than 8
15            set eggs = 1
16        else
17            set eggs = 2
18        display "Ingredients:" flour "g of flour and " eggs "eggs and " milk "ml of milk"
```

(a) What is the amount of each ingredient needed to make five pancakes?

.....

.....

(b) The maximum number of pancakes that can be entered is 17. Modify the algorithm so that the number of pancakes entered is limited to 17.

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 1 continues.

Question 1 (continued)

For Marker Use Only

(c) The algorithm needs to specify three eggs if 13 or more pancakes are required. Modify the algorithm to add this feature.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 2

For Marker Use Only

The following is a ***partially completed*** algorithm to keep track of the score for a game in which the player tries to shake objects from the branch of a tree. For each round of the game there are two shakes of the branch.

In the first round of the game seven objects are attached to the branch and the player shakes the branch and enters the number of objects that fall from the branch. The player then shakes the branch a second time and again enters the number of objects that fall from the branch.

The seven objects are then reattached to the branch for the next round and the process is repeated as often as required by the game. The player's current score is the total number of objects that have fallen so far in the game.

The player will receive a bonus if all the objects fall from the branch by the end of a round. For the bonus, the number of objects that fall in the first shake of the next round is added to the score twice.

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

```
1   Initially
2       set shake1 = 0
3       set shake2 = 0
4       set score = 0
5       set shake1_done = false

7   When a number is entered into the "Number to drop on first shake?" Textfield
8       if shake1_done equals false
9           set shake1 to value in "Number to drop on first shake?" TextField
10          set shake1_done = true
11          if shake1 greater than 7
12              set shake1 = 7
13          display shake1

14  When a number is entered into the "Number to drop on second shake?" Textfield
15      if shake1_done equals true
16          set shake2 to value in "Number to drop on second shake?" TextField
17          display shake2

18  When the "Score" button is pressed
19      set score = score + (shake1 + shake2)
20      set shake1_done = false
21      set shake1 = 0
22      set shake2 = 0
23      display score
```

(a) If the ***"Score" button*** is pressed for a round before a number has be placed in a text field, what number will the ***"Score" button*** algorithm use for the text field value?

.....

.....

Question 2 continues.

Question 2 (continued)

For Marker Use Only

(b) The algorithm does not implement all of the required features of the game.

(i) It does not validate the input to the second shake text field. The total number that can be shaken from the branch in a round is seven. If the input to the second shake is too high, it should be set to seven minus the number from the first shake.

(ii) It does not add the bonus to the score.

Indicate the changes that need to be made to implement these features.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 3

For Marker Use Only

John needs an applet to determine which travel option he should use. The user enters information on distance to be travelled and weather conditions, and the applet will then determine the travel option.

When John travels short distances from his home, he has the option of walking, using a bike or using a car.

John has worked out a system to decide which option he will use. The system has the following four rules:

1 To use his system, the distance to be travelled must be no more than 20 km.

2 For an option to be suitable, the travel time must be less than 60 minutes.

To work out the travel time, first the speed of travel is determined using the table below. The travel speed is sometimes reduced from the normal speed given in the first column due to the weather conditions.

Travel Option ***(normal speed)***	**Windy**	**Raining**	**Temperature less than 0°C and not raining**
Walk *(5 km/h)*	4 km/h	not an option	3 km/h
Bike *(15 km/h)*	not an option	not an option	not an option
Car *(50 km/h)*	50 km/h	40 km/h	not an option

The travel time is then calculated using the formula:

Travel time in minutes = 60 x distance / speed

3 If there is more than one option available, then his preference is first to use the bike, then walk and last the car.

4 There are some situations in which the system does not provide an option.

John would like an applet that will use his system to determine which, if any, of his travel options he will use.

By answering parts (a) and (b), you are to create an algorithm to implement this applet.

Notes:

- The applet should work correctly no matter in what order the buttons or textfields are used.
- It can be assumed that all data entered is the appropriate type for each textfield.
- Appropriate variable names are to be used.

Question 3 continues.

For Marker Use Only

(a) Design a possible screen for this applet, identifying all the textfields and/or buttons to be used.

(b) Using the Initially/When model, write an algorithm for this applet.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 3 continues.

Question 3 (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 are answering.)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

OFFICE OF TASMANIAN ASSESSMENT, STANDARDS & CERTIFICATION