

## Computational Analysis Task

### Casio ClassPad



The organisers of a surf contest examine two Victorian beaches as proposed venues for the contest. Each day, for two weeks, the organisers record the height of the surf (in metres). Their measurements are shown below:

#### Bell's Beach:

1.2	1.5	1.6	1.3	1.8	1.4	1.6
1.3	1.4	1.8	1.5	1.4	1.1	1.0

#### Cape Woolamai:

0.9	1.8	0.7	1.8	1.9	0.4	0.6
1.6	1.9	2.2	2.4	1.8	1.5	1.9

#### The Statistical Analysis Task:

Your task, now, will be to complete a computational statistical analysis of the above data and compare this analysis to one done manually. You will then analyse the data and make conclusions regarding its significance.

The standard approach of analysing data sets such as these is to actually complete a number of different techniques including one called the *five number summary*.

Each technique basically calculates an average using different types of computer algorithms. The algorithms themselves will look at:

*The Mean*

*The Median*

*The Mode*

The five number summary itself looks at:

*The Minimum Value*

*The 3<sup>rd</sup> Quartile*

*The Median*

*The 1<sup>st</sup> Quartile and*

*The Maximum Value*

Refresher notes and instructions on how to computationally perform the statistical analysis can be found in the background reading section.

**Analysis of the Data:**

**Aim:**

- (a) To analyse meteorological data to determine which beach has optimum surf conditions for a surf carnival.
- (b) To demonstrate how advances in computational power has enabled us to analyse data more quickly and efficiently.

**Analysis of Surf Data:**

**Part A:** You are required to electronically time yourself, as you analyse the following data using a scientific calculator. You might consider using the Statistical Analysis Reference sheet if required.

1. Order the Bell's Beach data from smallest to largest:

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2. Calculate the Bell's Beach Mean wave height:

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3. Determine the Bell's Beach Median wave height:

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4. Calculate the Range of the Bell's Beach surf data:

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5. Calculate the Interquartile Range (IQR) of the Bell's Beach surf data:

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6. Order the Cape Woolamai data from smallest to largest:

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7. Calculate the Cape Woolamai Mean wave height:

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8. Determine the Cape Woolamai Median wave height:

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9. Calculate the Range of the Cape Woolamai surf data:

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10. Calculate the Interquartile Range (IQR) of the Cape Woolamai surf data:

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**Part B:** You are now required to electronically time yourself, as you analyse the following data using CAS technology. You might consider using the CAS Technology for Statistical Analysis reference sheet if required.

1. On the **Statistics** page, label **list 1** as 'Bell's' and **list 2** as 'Woolamai'. Enter the corresponding values for each beach as shown in the table. Press **Enter** after entering each data value into the CAS calculator.

2. To find the mean and five number summary of each data set, tap:

**Calc**  
**Two-variable.**

Set values as:

**XList: main\Bell's**  
**YList: main\Woolamai**  
**Freq: 1**  
**Tap OK**

The x-values relate to Bell's Beach and the y-values to Cape Woolamai. Scroll down to see all the statistics.

3. Use the summary statistical results from columns E and F to answer the questions below. Column E represents "Bell's Beach" and Column F represents "Cape Woolamai".



**Questions**

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2. What is the median Bell's Beach wave height?

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3. Calculate the Range of the Bell's Beach surf data:

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4. Calculate the Interquartile Range (IQR) of the Bell's Beach surf data:

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5. What is the mean Cape Woolamai wave height?

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6. What is the median Cape Woolamai wave height?

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7. Calculate the Range of the Cape Woolamai surf data:

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8. Calculate the Interquartile Range (IQR) of the Cape Woolamai surf data:

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9. The surf contest organisers would like the greatest height possible. However, a minimum height of 1.2 metres is required for the surf contest to run. Which beach would you recommend?

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### Reflection of Data Analysis Activity:

In the final part of this task, you will be required to reflect on how advances in computational processing has allowed for two significant ramifications: a) the increase in the amount of data being able to be processed as well as b) the decrease in time taken to actually analyse the data.

To assist you in the planning of your reflection, you will need to complete the below advanced organiser to compare/contrast the two methods used to analyse the data from the task just undertaken.

Topic: \_\_\_\_\_

Concept 1:

Concept 2:

How are they alike?

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How are they different?

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