



Skills for Computing

SAMPLE

Marking Scheme

This marking scheme has been prepared as a **guide only** to markers. This is not a set of model answers, or the exclusive answers to the questions, and there will frequently be alternative responses which will provide a valid answer. Markers are advised that, unless a question specifies that an answer be provided in a particular form, then an answer that is correct (factually or in practical terms) **must** be given the available marks.

If there is doubt as to the correctness of an answer, the relevant NCC Education materials should be the first authority.

Throughout the marking, please credit any valid alternative point.

Where markers award half marks in any part of a question, they should ensure that the total mark recorded for the question is rounded up to a whole mark.

Answer ALL questions

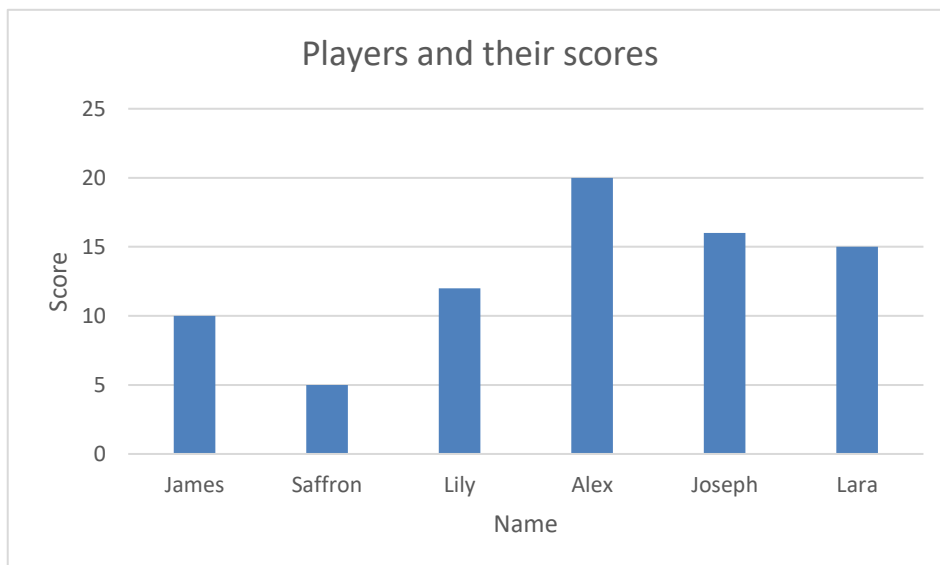
Question 1

A computer game competition has 6 competitors. Each competitor is given a score for each game they play. The current scores are shown in the following table:

Name	Score
James	10
Saffron	5
Lily	12
Alex	20
Joseph	16
Lara	15

- a) Draw a bar graph for the competitors and their scores.

6



1 mark each:

- appropriate title
- x axis and title
- y axis and title

1 mark for 2 correct bars, up to max 3

- b) Explain why a histogram is **not** appropriate to represent this data.

2

Mark scheme

1 mark each:

- Histogram shows frequencies of values, this data is not frequencies of names
- Histogram is used to show the changes with each measurement, this data is individual scores and not changes

Marks
2

- c) Explain whether the data collected is primary, or secondary data.

Mark scheme

1 mark each

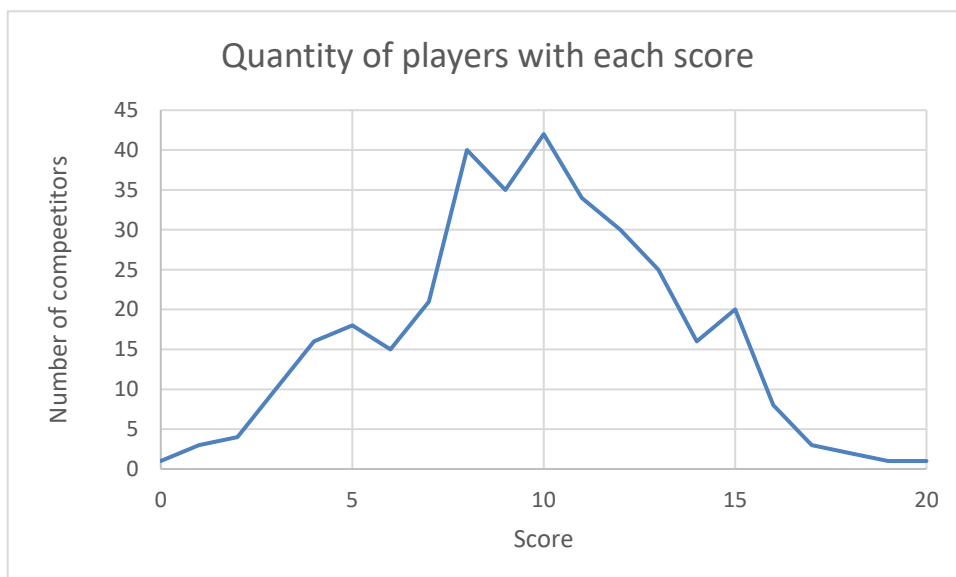
- **primary**
- **It is collected direct from the source**

Total 10 Marks

Question 2

The computer game competition is opened up to run nationwide. The company running the overall competition asks the organiser of each event for their player scores.

The data is plotted as a line graph:



- a) Describe the distribution shown in this graph.

4

Mark scheme

1 mark each to a max of 4:

- **Normal distribution**
- **Most competitors in the middle range / between 8**
- **Fewer in the outliers**
- **Fewer gain very few marks**
- **Fewer gain very high marks**

- b) Explain how errors could have been introduced in the gathering of the scores from each individual competition. 4

Mark scheme

1 mark each to a max of 4: e.g.

- ***Incorrectly entering a value***
- ***Transposition error***
- ***Systemic error***
- ***Transfer error***

- c) The mean score is 9.64 with a standard deviation of 2.97

- i) Identify the range that falls within one standard deviation of the mean. 1

Mark scheme

9.64 ± 2.97 // **6.67 - 12.61 // 5.94**

- ii) Give the range that would provide a 90% confidence interval. 1

Mark scheme

9.64 ± 5.94 // **3.7 - 15.58 // 11.88**

Total 10 Marks

Question 3

- a) A researcher is investigating the effect a medicine has on patients. Explain how the size of the dataset could impact the results. 2

Mark scheme

1 mark each to a max of 2 e.g.

- ***If there are too few then the results will not be reliable***
- ***Needs to have a large number because of the infinite differences between patients***
- ***Needs to have a large number to make the results meaningful***

- b) The researcher uses a control set. 2
Explain why using a control set is appropriate for this research.

Mark scheme

1 mark each to a max of 2 e.g.

- ***One set will have the medicine, one set will have a placebo / not have the medicine***
- ***Measurements can be affected by changing conditions***
- ***Check whether there is a significant difference between the two sets***

c) Some of the data collected is shown:

Quantity	Average change
0.1	1.3
0.2	1.5
0.5	2.0
1.0	5.0
1.5	4.3
2.0	4.5

Calculate Pearson's correlation coefficient for the quantity and average change.
Give your answer to two decimal places.

Mark scheme

Quantity	Average change	xy	x^2	y^2
0.1	1.3	0.13	0.01	1.69
0.2	1.5	0.3	0.04	2.25
0.5	2.0	1	0.25	4
1.0	5.0	5	1	25
1.5	4.3	6.45	2.25	18.49
2.0	4.5	9	4	20.25
$\sum x = 5.3$	$\sum y = 18.6$	$\sum xy = 21.88$	$\sum x^2 = 7.55$	$\sum y^2 = 71.68$

Award ½ mark for $\sum x$ and ½ mark for $\sum y$

Award 1 mark for correctly completed xy column and $\sum xy$

Award 1 mark for correctly completed x^2 column and $\sum x^2$

Award 1 mark for correctly completed y^2 column and $\sum y^2$

Award 1 mark for workings

Award 1 mark for r

Give credit for other appropriate workings not presented in tabular form.

Using:

$$\begin{aligned}
 R &= \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n\sum x_i^2 - (\sum x_i)^2)(n\sum y_i^2 - (\sum y_i)^2)}} \\
 &= \frac{6(21.88) - 5.3(18.6)}{\sqrt{(6(7.55) - (5.3)^2)(6(71.68) - (18.6)^2)}} \\
 &= \frac{32.7}{\sqrt{38.05}} \\
 R &= 0.86 \text{ (2dp)}
 \end{aligned}$$

Total 10 Marks

Question 4

A film company's most recent release did not make enough sales to break even. The managers in the company are going to meet to decide what sort of film they should make next.

- a) Explain the right- and left-brained activities that will be used to help make their decision. Relate your answer to the above scenario. 5

Mark scheme

1 mark per bullet e.g. (max 3 for right and max 3 for left, allow combined for points in both to a maximum of 5 marks total)

Right-brain:

- **Gather and organise known information about film sales/customers**
- **Generate the ideas for films**
- **Implement the ideas**
- **Communicate results**
- **Learn from the experience to make future changes**

Left-brain:

- **Gather and organise known information about film sales/customers**
- **Consider the positive points of the ideas**
- **Consider the negative points of the ideas**
- **Implement the ideas**
- **Evaluate the solution/implementation**
- **Learn from the experience to make future changes**

- b) The managers considered using the 6-hats method. 5
Explain whether the managers should use the 6 hats in serial or in parallel.

Mark scheme

1 mark per bullet to a max of 5 e.g.

- **In serial each hat is used one at a time**
- **This will allow all managers to focus on one activity at a time**
- **This will allow more opinions for each activity**
- **...and therefore a wider range of options**
- **...however only gives a limited scope for discussion**

- **In parallel each person wears a different hat**
- **This allows the ideas to be critiqued and discussed dynamically**
- **...however people may have ideas/opinions that are relevant but cannot be expressed because it is not representative of their hat**

Total 10 Marks

Question 5

- a) From your personal studies give ONE (1) example where you have used the CREAM model for learning and explain how it helps you get the most out of your work. 5

Mark Scheme

1 mark for an application of how it was used e.g. I used it to improve my mathematical skills

mark for each point up to a maximum of 5 marks e.g.

- **Creative by applying my knowledge instead of memorising it**
- **Reflecting on my results/answers**
- **...evaluating my experience**
- **...identifying my strengths and weakness**
- **Effective - organising my time and resources to allow me to work efficiently**
- **Active - practicing my maths skills by answering lots of questions**
- **Motivated - set myself clear goals and objectives on what I want to be able to do**

- b) Give ONE (1) example where you have made use of speed reading in your studies **and** explain why this was appropriate. 2

Mark Scheme

1 mark for identification e.g. reading the summaries in a textbook

1 mark for reason e.g. to gain the important elements

- c) Give ONE (1) example where you have made use of detailed reading in your studies **and** explain why this was appropriate. 2

Mark Scheme

1 mark for identification e.g. learning from a textbook

1 mark for reason e.g. to gain an understanding of the topic

- d) Give ONE (1) example of a source that would be written in a bibliography but not in a reference list. 1

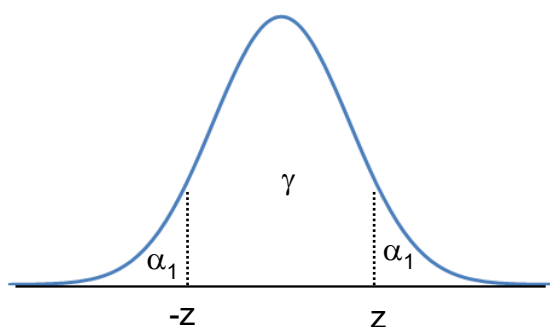
Mark Scheme

1 mark e.g. a book that was read but not directly referred to in the text

Total 10 Marks

End of paper

1. Percentage points of the normal distribution



α_1	15.87%	15%	5.00%	2.50%	2.28%	1.00%	0.50%
γ	68.27%	70.00%	90.00%	95.00%	95.45%	98.00%	99.00%
z	1.0000	1.0364	1.6449	1.9600	2.0000	2.3263	2.5758

2. Formulae

Spearman's Rank Correlation (with no ties)

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

The Pearson Correlation Function

$$R = r = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n \sum x_i^2 - (\sum x_i)^2)(n \sum y_i^2 - (\sum y_i)^2)}}$$

Simple Linear Regression

$$\hat{y} = mx_i + c$$

is the least SSE straight line where:

$$m = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$m = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{n \sum x_i^2 - (\sum x_i)^2}$$

$$c = \bar{y} - m\bar{x}$$

The Coefficient of Determination

$$R^2 = r^2 = \frac{\sum (\hat{y} - \bar{y})^2}{\sum (y - \bar{y})^2}$$

Marking note

Multiply original mark out of 50 by two to produce final mark out of 100 to be recorded.

Learning Outcomes matrix

Question	Learning Outcomes assessed	Marker can differentiate between varying levels of achievement
1	2, 4	Yes
2	2, 4	Yes
3	2, 4	Yes
4	3	Yes
5	1, 5	Yes

Grade descriptors

Learning Outcome	Pass	Merit	Distinction
Be able to use various skills to support the study of Computing	Draw upon and make use of an adequate range of skills	Draw upon a variety of skills and make an appropriate selection	Draw upon a wide range of skills and make a highly appropriate selection
Be able to communicate in a technical environment	Demonstrate adequate standard of communication	Demonstrate strong and consistent standard of communication	Demonstrate highly skilful, exemplary standard of communication
Be able to deploy thinking skills and problem-solving paradigms in both a business and learning context.	Demonstrate adequate deployment of skills and paradigms	Demonstrate sound and appropriate deployment of skills and paradigms	Demonstrate highly effective deployment of skills and paradigms
Be able to handle and present data	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand the need for lifelong learning	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding