National 5
Coursework
Assessment Task

National 5 Computing Science
Assignment
Assessment task

This document provides information for teachers and lecturers about the coursework component of this course in terms of the skills, knowledge and understanding that are assessed. It must be read in conjunction with the course specification.

Valid for session 2020–21 only.

This assessment is given to centres in strictest confidence. You must keep it in a secure place until it is used.

Where practically possible, you should adhere to the published conditions of assessment for this assignment in order to maintain the reliability and validity of the assessment evidence generated.

This edition: December 2020 (version 1.0)

Computing Science assessment task: evidence checklist

You should complete the checklist for task 1 and either task 2 or task 3.

Task 1 – Software design and development		
Part A	**Evidence**	
1a	Completed task 1 sheet identifying the missing inputs	☐
Part B	**Evidence**	
1b	Completed task 1 sheet showing the expanded design for 'calculate average length of words in sentence'	☐
Part C	**Evidence**	
1c	Printout of your program code	☐
1d (i)	Printout evidence of the test run showing inputs and outputs	☐
1d (ii)	Completed task 1 sheet showing the completed test table	☐
1e	Completed task 1 sheet with evaluation	☐

Task 2 – Database design and development		
Part A	**Evidence**	
2a	Completed task 2 sheet showing the analysis of inputs	☐
Part B	**Evidence**	
2b	Completed task 2 sheet showing the primary and foreign keys in the data dictionary	☐
Part C	**Evidence**	
2c	Printout or screenshot showing correct validation implemented for shirtNumber field	☐
2d (i)	Printout of SQL statement to change player's information	☐
	Printout of the updated Player table	☐
2d(ii)	Printout of SQL statement to display a list of suitable players.	☐
	Printout of the output from the SQL statement	☐
2e	Completed task 2 sheet explaining why the output is not correct	☐
2f (i)	Completed task 2 sheet identifying the value that produces an error	☐
2f (ii)	Completed task 2 sheet with explanation of why this error is expected	☐

Task 3 – Web design and development		
	Evidence	
3a	Completed task 3 sheet stating two end-user requirements	☐
3b	Completed task 3 sheet showing a wireframe design for the first aid page	☐
3c 3d (i) 3d (ii)	Printout of HTML and CSS code: ♦ firstAid.html ♦ soundMixing.html ♦ home.html ♦ styles.css	☐
3e	Completed task sheet 3 discussing the results of testing your website	☐
3f	Completed task sheet 3 with evaluation of fitness for purpose	☐

Please follow the steps below before handing your evidence to your teacher or lecturer:

- Check you have completed all parts of task 1 and either task 2 or task 3.
- Label any printouts and/or screenshots with the task number (for example, 1c, 2a).
- Clearly display your name and candidate number on each printout.

Task 1: software design and development (part A)

The measurement of how easy a sentence is to read is called the reading age. One method of calculating this is to use the average length of the words in the sentence.

So, the longer the average word length, the higher the reading age.

Program analysis
A program is required to calculate the approximate reading age (junior, teen or senior) of a single sentence with a maximum of 20 words. The user will enter each word of the sentence, one at a time. The program will then calculate the average word length and display an appropriate message.

1a Complete the analysis below by identifying the missing inputs.

(2 marks)

Inputs ♦ ♦
Processes ♦ calculate the average word length (total number of characters divided by number of words) ♦ decide which message to display
Outputs ♦ each word in the sentence displayed on a new line ♦ one appropriate message from: — Short words – suitable for junior readers — Medium words – suitable for teen readers — Long words – suitable for senior readers

- Check your answers carefully, as you cannot return to part A after you hand it in.
- When you are ready, hand part A to your teacher or lecturer and collect part B.

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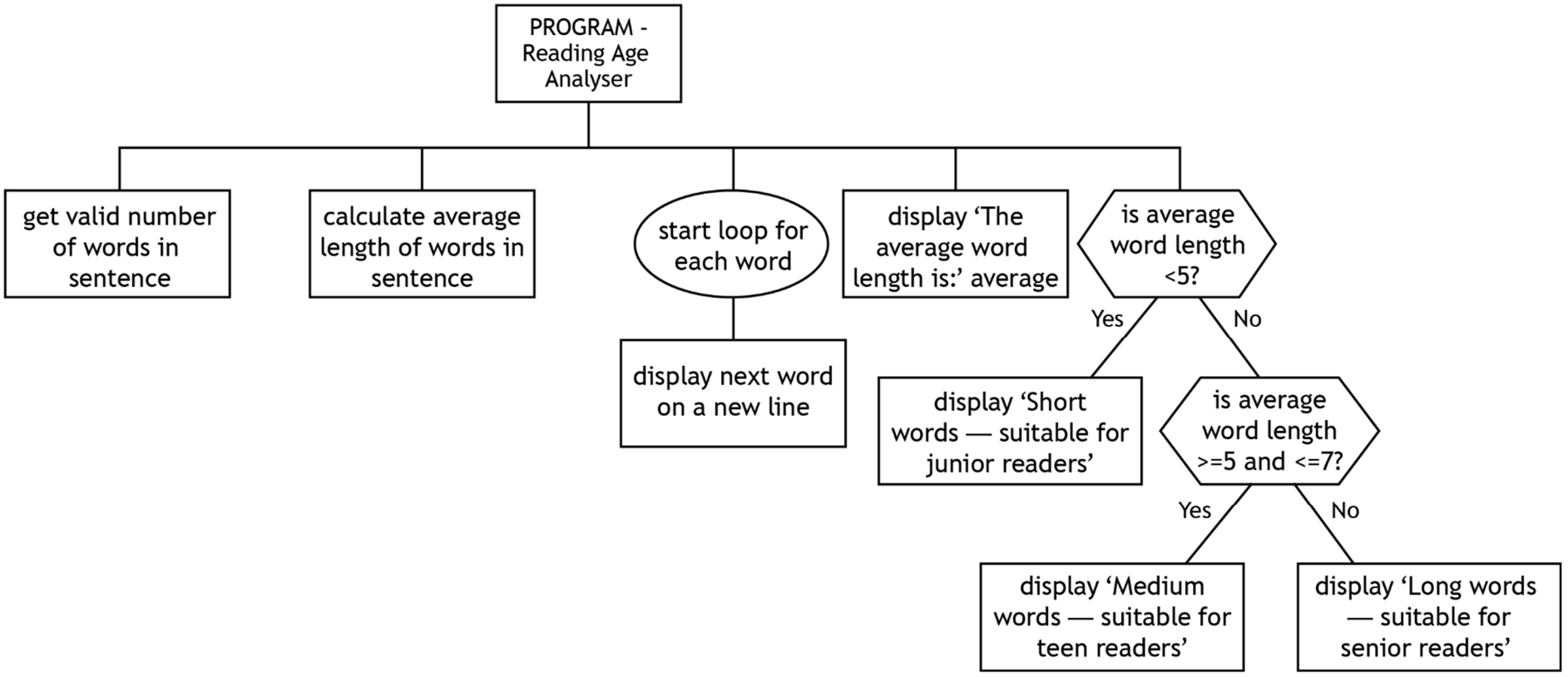
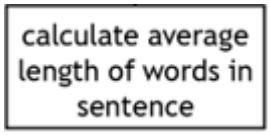
Task 1: software design and development (part B)

Program design (structure diagram)



1b The structure diagram contains the following process:



Using the information provided in the program analysis, expand the design to show how this process could be carried out. You can use a flowchart, structure diagram or pseudocode design.

(3 marks)

- Check your answers carefully, as you cannot return to part B after you hand it in.
- When you are ready, hand part B to your teacher or lecturer and collect part C.

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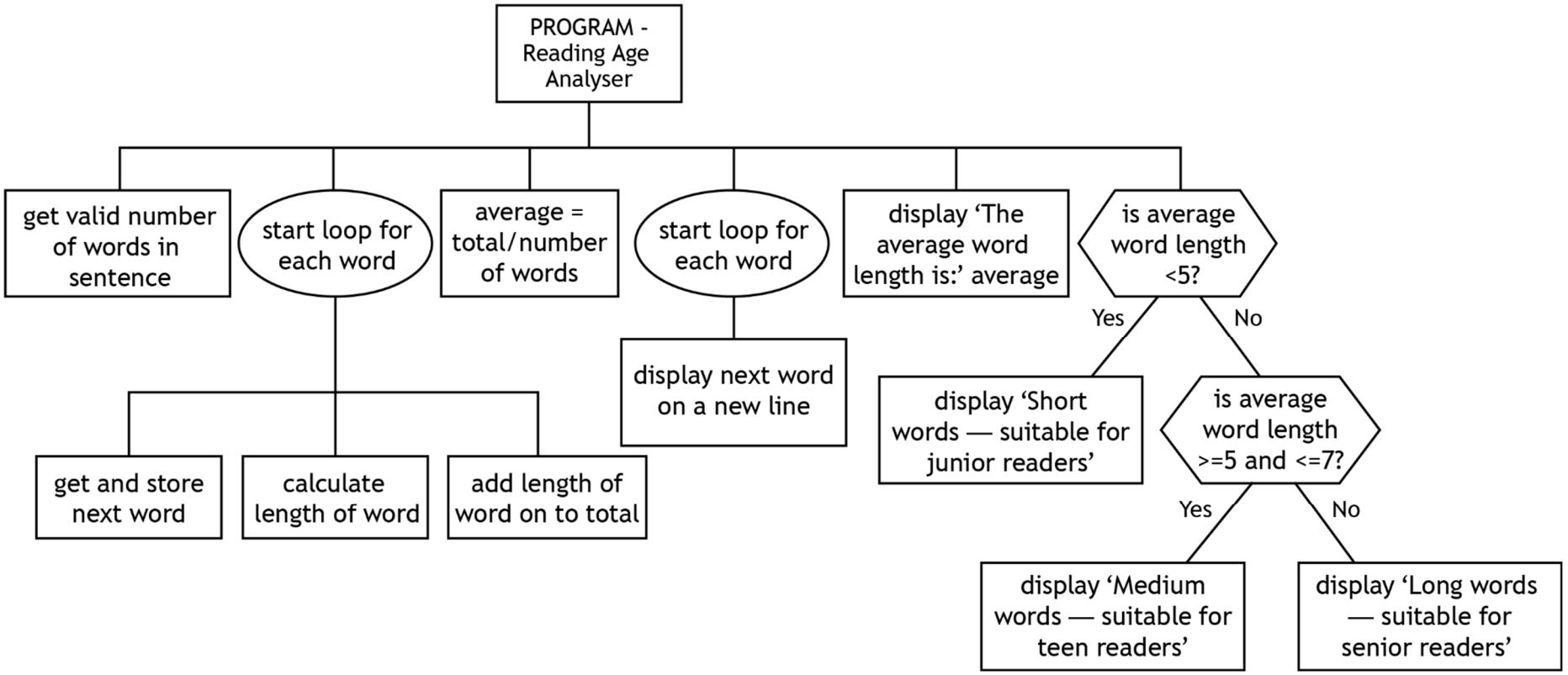
Task 1: software design and development (part C)

Program design (completed structure diagram)



1c Using the program analysis and the design, implement the program in a language of your choice.

Ensure the program matches the completed structure diagram.
Print evidence of your program code.

(15 marks)

1d (i) You should test your program to ensure it produces the expected output.

Use the following data to check that the message 'Long words — suitable for senior readers' is displayed:

Number of words:	5
Words in sentence:	Distressed tourists wandering around aimlessly

Run your program to show that it produces the correct message.
Print evidence of the test run showing inputs and outputs.

(1 mark)

(ii) Additional test data is required to check that the other two messages are also displayed correctly.

Complete the test table below with data that could be used to produce the other two messages.

Test data	Expected results
Number of words: Sentence:	'Short words — suitable for junior readers' is displayed.
Number of words: Sentence:	'Medium words — suitable for teen readers' is displayed.

(2 marks)

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1e With reference to your code, evaluate your program by commenting on the following:

Efficiency of your program code **(1 mark)**
Readability of your program code **(1 mark)**

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Task 2: database design and development (part A)

The Scottish Amateur Women's Football Association keeps details of clubs and players who play their leagues.

Each club plays matches in one of three football leagues. Each club's football pitch is identified by an address (street and postcode). The date each club was first formed is recorded. The Association's rules state that no club is allowed to have the same name as another.

Players are given a unique registration number. The Association records their forename, surname, date of birth and the club they play for. Players are required to supply a mobile phone number, so they can be contacted about match fixtures or cancellations. Each club is required to inform the Association of each player's shirt number and their preferred playing position (Striker, Midfielder, Defender or Goalkeeper).

Players cannot be registered unless they are a member of one of the Association's clubs.

2a The Association wants to create a database to keep club and player details.

Complete the missing club and player details in the analysis of inputs table below:

(2 marks)

Club details:	**Player details:**
Street Postcode	Forename Surname

- Check your answers carefully, as you cannot return to part A after you hand it in.
- When you are ready, hand part A to your teacher or lecturer and collect part B.

Candidate name_____ Candidate number_____

Task 2: database design and development (part B)

2b Complete the data dictionary below, by identifying the primary and foreign keys in the relational database.

(2 mark)

Entity: Club					
Attribute name	**Key**	**Type**	**Size**	**Required**	**Validation**
clubName		text	20	Y	length <= 20
street		text	40	Y	length <= 40
postcode		text	8	Y	length <= 8
formed		date		Y	
league		number		Y	Restricted choice: 1,2,3

Entity: Player					
Attribute name	**Key**	**Type**	**Size**	**Required**	**Validation**
forename		text	20	Y	
surname		text	30	Y	
registration		number		Y	Range: >= 100000 and <= 999999
clubName		text	20	Y	Existing clubName from Club table
mobileNo		text	12	Y	length = 12
dateOfBirth		date		Y	
position		text	10	Y	Restricted choice: Striker, Midfielder, Defender, Goalkeeper
shirtNumber		number		Y	Range: >= 1 and <= 25

- Check your answers carefully, as you cannot return to part B after you hand it in.
- When you are ready, hand part B to your teacher or lecturer and collect part C.

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Task 2: database design and development (part C)

2c Your teacher or lecturer will provide you with a database file containing two linked tables.

Entity: Club					
Attribute name	**Key**	**Type**	**Size**	**Required**	**Validation**
clubName	PK	text	20	Y	length <= 20
street		text	40	Y	length <= 40
postcode		text	8	Y	length <= 8
formed		date		Y	
league		number		Y	Restricted choice: 1,2,3

Entity: Player					
Attribute name	**Key**	**Type**	**Size**	**Required**	**Validation**
forename		text	20	Y	
surname		text	30	Y	
registration	PK	number		Y	Range: >= 100000 and <= 999999
clubName	FK	text	20	Y	Existing clubName from Club table
mobileNo		text	12	Y	length = 12
dateOfBirth		date		Y	
position		text	10	Y	Restricted choice: Striker, Midfielder, Defender, Goalkeeper
shirtNumber		number		Y	Range: >= 1 and <= 25

Using the data dictionary above, complete the relational database by:

- adding the required validation to the shirtNumber field.

(1 mark)

Print evidence to show that you have added the validation to the database, to match the data dictionary requirements.

2d (i) Noreen Glass, registration number 814209, has moved teams from Aviemore Aces to Dundee North. She will play in the number 24 shirt at her new club.

Implement **one** SQL statement that will make the required changes to Noreen's information.

(3 marks)

Print evidence of the SQL statement and the Player table, clearly showing the change you have implemented.

(ii) The Association would like to invite suitable players to a goalkeeper coaching day.

Implement an SQL statement that will only display a list of club names, players' full names and mobile phone numbers for all league 1 goalkeepers.

(4 marks)

Print evidence of the SQL statement and the output.

2e The Association's rules state that players who play in the 'Striker' position are given a shirt number between 10 and 15.

Test the following SQL statement, which is intended to identify strikers who do not have the correct shirt number:

```
SELECT forename, surname
FROM Player
WHERE shirtNumber <10
OR shirtNumber > 15;
```

Explain why the output is not correct.

(1 mark)

2f The following SQL statement produces an error when executed.

```
INSERT INTO Player
VALUES (220745,"Unknown","Erin","Smith","07993 874657",
"31/05/1999","Striker",23);
```

(i) Identify the value in the SQL statement that produces an error.

(1 mark)

(ii) Explain why this error is expected if the database is fit for purpose.

(1 mark)

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Task 3: web design and development

Montpel Youth Club would like to create a website to advertise their club.

The website should contain information about where and when the club meets. Pictures of each club leader should be displayed on the home page, along with a short paragraph detailing their experience of working with young adults.

Each week night, leaders run an activity. Lists of the activities for the current and following weeks need to be kept up-to-date on the website. The club also wants to include some additional activity information. For example, for the first aid activity, the club would like to have a page showing what members learned at this activity.

Club members pay to attend some of the activities. Prices should be listed on the website.

3a State **two** end-user requirements for this website.

End-user requirement 1 **(1 mark)**
End-user requirement 2 **(1 mark)**

Candidate name_____ Candidate number_____

First aid is one of the activities run by the youth club. The first aid page will include content covered at the activity, as follows:

- a link to a website which contains a video of how to make an arm sling
- a main heading 'How to make an Arm Sling'
- a numbered list detailing the steps required to put someone's arm into a sling
- a graphic called 'armsling.jpg'
- a paragraph of text introducing the numbered list

3b In the space below, draw a wireframe design showing how you would position the above content on the page.

(2 marks)

Candidate name_____ Candidate number_____

Your teacher or lecturer will provide you with a copy of the unfinished website.

Open this and look carefully at:

- the home page
- the content of each page or the incomplete 'First Aid' page
- the hyperlinks within the website

3c The 'First Aid' page currently has no content. Open the 'firstAid.html' file in order to edit it.

Implement your design using HTML. The file 'armsling.jpg' has been provided within the website files.

(4 marks)

The additional information required to complete the 'link to a website', 'paragraph of text' and 'numbered list' is listed below:

- video page link address

  https://www.sja.org.uk/get-advice/first-aid-advice/how-to/how-to-make-an-arm-sling/

- paragraph of text

  When someone hurts their arm or shoulder badly, it is important to hold the injury still using a sling. Instructions detailing how to put a sling on a patient are given below.

- numbered list

  1. Before applying a sling, check for cuts and make sure any bleeding has stopped.
  2. For forearm slings, use padding for the injured arm and tie the sling around the patient's neck on the uninjured side.
  3. For shoulder or collarbone slings, drape the long side of the bandage down from the shoulder on the uninjured side, bring it over your patient's arm and tie it behind their back.
  4. Make sure the sling keeps your patient's arm in place but is not so tight that it limits blood flow.
  5. If there is severe bleeding or if you suspect a dislocated joint or broken bone, see a doctor immediately.

3d (i) Sound Mixing is another activity that the youth club has created a web page for.

The activity leader would like to add a sound mixing example to this page.

Open the soundMixing.html page in order to edit it.

Using the file 'mixExample.mp3', edit the Sound Mixing page to add this sound.

(1 mark)

3d (ii) User feedback suggests the following changes to how the website looks.

Open the 'home.html' and 'styles.css' files in order to edit them.

Using external styles make all the following changes:

- the background colour of the page should be "lightblue" (#ADD8E6)
- the middle 'Facilities' part of the page should be styled with the same colour as the page background
- the h2 headings should be reduced to size 14 and the font changed to Arial

(3 marks)

Print evidence of your code from these edited files:

- firstAid.html
- soundMixing.html
- home.html
- styles.css

3e Test the website to ensure that all media displays correctly and that any hyperlinks work as expected.

Discuss the results of testing the website.

(1 mark)

Candidate name_____ Candidate number_____

3f Initial analysis identified the following functional requirements for the website.

The website should display:

- where the club meets
- when the club meets
- photographs of each leader
- a paragraph about each leader
- a list of activities for this week
- a list of activities for next week
- additional information on activities, where required
- the cost of some activities

Use the above analysis to evaluate the finished website in terms of fitness for purpose.

(2 marks)

Candidate name_____ Candidate number_____