National 5
Coursework
Assessment Task

# National 5 Computing Science Assignment

# Assessment task

**This is the assessment task for the National 5 Computing Science Assignment.**

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 2017–18 only.**



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# Computing Science assessment task: evidence checklist

| Task 1 | Evidence | |
|---|---|---|
| Part A | | |
| 1a | Completed task 1 sheet showing analysis of database inputs | ☐ |
| 1b | Completed task 1 sheet showing data dictionary | ☐ |
| Part B | | |
| 1c | Printout or screenshots of new database table – showing:<br>• new fields<br>• data types have been created for the new fields<br>• correct validation has been set up for the new fields | ☐<br>☐<br>☐ |
| | Printout showing evidence that a relationship exists between the two tables | ☐ |
| 1d | SQL statement to edit staff address | ☐ |
| | Printout of Staff table showing changed staff address | ☐ |
| **Task 2** | **Evidence** | |
| 2a | Printout of your program code | ☐ |
| 2b | Completed task 2 sheet showing the test table | ☐ |
| | Printout evidence of test runs showing inputs and outputs for the test table | ☐ |
| 2c | Completed task 2 sheet showing the required extreme test data values | ☐ |
| 2d | Completed task 2 sheet showing evaluation | ☐ |
| **Task 3** | **Evidence** | |
| 3a | Completed task 3 sheet showing the functional requirements | ☐ |
| 3b | Printout evidence of HTML and CSS files showing new page | ☐ |
| | Printout of web page showing how it looks in a web browser | ☐ |

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

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

## Task 1: database design and development (part A)

Greenhands is a gardening company which employs staff to do jobs for its customers. The company keeps its staff details on paper cards.

| | | | |
|---|---|---|---|
| Staff ID | DS021 | Address | 12 Leaf Avenue<br>Farmridge<br>Bowness |
| Forename | Derek | | |
| Surname | Strimmer | | |
| Top Skill<br>(lawn, hedge or weeds) | Weeds | Customer Rating<br>(1-10) | 6 |

When requesting work to be completed in their garden, customers fill in a Customer Job Details form and send it to Greenhands. An example of the form is shown below.

Greenhands Gardening Services

### Customer Job Details

Name: Paula Smith

Address: 49 Daisy Drive, Grangemouth

Post Code: FA12 8HG

Contact Telephone Number: 07973 276455

Task (please tick one box only)

- ☐ Lawn Mowed
- ☑ Hedge Cut
- ☐ Weeds Pulled

*For Office Use Only*
*Job Information*

*Staff ID* _____

*Date* _____

*Time* _____

*Job ID* _____

Please return to:
Greenhands Ltd, 12 High Street, Falkirk

The office staff complete the Customer Job Details Form by contacting the customer to arrange a date and time for the task. Staff members are selected for each job by matching their 'top skill' to the customer's requested task.

1a Greenhands wishes to create a database to store its staff and job details. Complete the job details in the analysis of inputs table below:

**(3 marks)**

| **Staff details:** | **Job details:** |
|---|---|
| Staff ID<br>Staff Forename<br>Staff Surname<br>Address<br>Top Skill<br>Customer Rating | |

1b Complete the data dictionary for the Staff entity.

**(5 marks)**

| **Entity name: Staff** | | | | | |
|---|---|---|---|---|---|
| **Attribute name** | **Key** | **Type** | **Size** | **Required** | **Validation** |
| staffID | | text | 5 | | length = 5 |
| forename | | text | 20 | Y | |
| surname | | | 20 | Y | |
| address | | text | 50 | Y | |
| topSkill | | text | 5 | Y | |
| custRating | | number | | N | |

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

Candidate name_____ Candidate number_____

## Task 1: database design and development (part B)

1c Your teacher or lecturer will provide you with a partially completed database file.

Using the data dictionary below complete the relational database by:

- creating a new table to store the job details
- adding all validation to the job entity
- creating a relationship between the two tables

**(5 marks)**

| **Entity name: Staff** | | | | | |
|---|---|---|---|---|---|
| **Attribute name** | **Key** | **Type** | **Size** | **Required** | **Validation** |
| staffID | PK | text | 5 | Y | length = 5 |
| forename | | text | 20 | Y | |
| surname | | text | 20 | Y | |
| address | | text | 50 | Y | |
| topSkill | | text | 5 | Y | restricted choice: lawn, hedge, weeds |
| custRating | | number | | N | Range >= 1 and <= 10 |
| **Entity name: Job** | | | | | |
| **Attribute name** | **Key** | **Type** | **Size** | **Required** | **Validation** |
| jobID | PK | number | | Y | |
| jobDate | | date | | Y | |
| jobTime | | time | | Y | Range >= 9:00 and <= 18:00 |
| custName | | text | 40 | Y | |
| custAddress | | text | 50 | Y | |
| custPostcode | | text | 8 | Y | |
| phoneNo | | text | 11 | N | |
| task | | text | 12 | Y | restricted choice: Lawn Mowed, Hedge Cut, Weeds Pulled |
| staffID | FK | text | 5 | Y | existing staffID from Staff table |

Print evidence to show that you have:

- created a new table to store the job details
- added all validation to the job entity
- created a relationship between the two tables

1d Staff member DS021 has moved house recently.

Implement an SQL statement that will change the address of this member of staff to:

99 Willow Way, Falkirk, FA87 6FE

**(2 marks)**

Print evidence of your SQL statement and the Staff table (clearly showing the new address) once the SQL statement has been implemented.

## Task 2: software design and development

Scotven offers a mobile wi-fi service at outdoor events. They check the signal strength by taking readings from five locations.


The analysis and design for a program is shown below:

**Program analysis**

A program is required to display the five readings taken at the event and a signal pattern. The signal pattern will show the strength of readings (S = strong, M = medium and P = poor) in the order the readings were taken (1 to 5), for example "SSMPS".

**Assumptions**

- readings of signal strengths are recorded with two decimal places from 0.00% to 100.00%
- a strong signal is greater than 80% signal strength
- a medium signal is less than a strong signal and more than a poor signal
- a poor signal is less than 30% signal strength

**Inputs**

- five valid readings from the venue

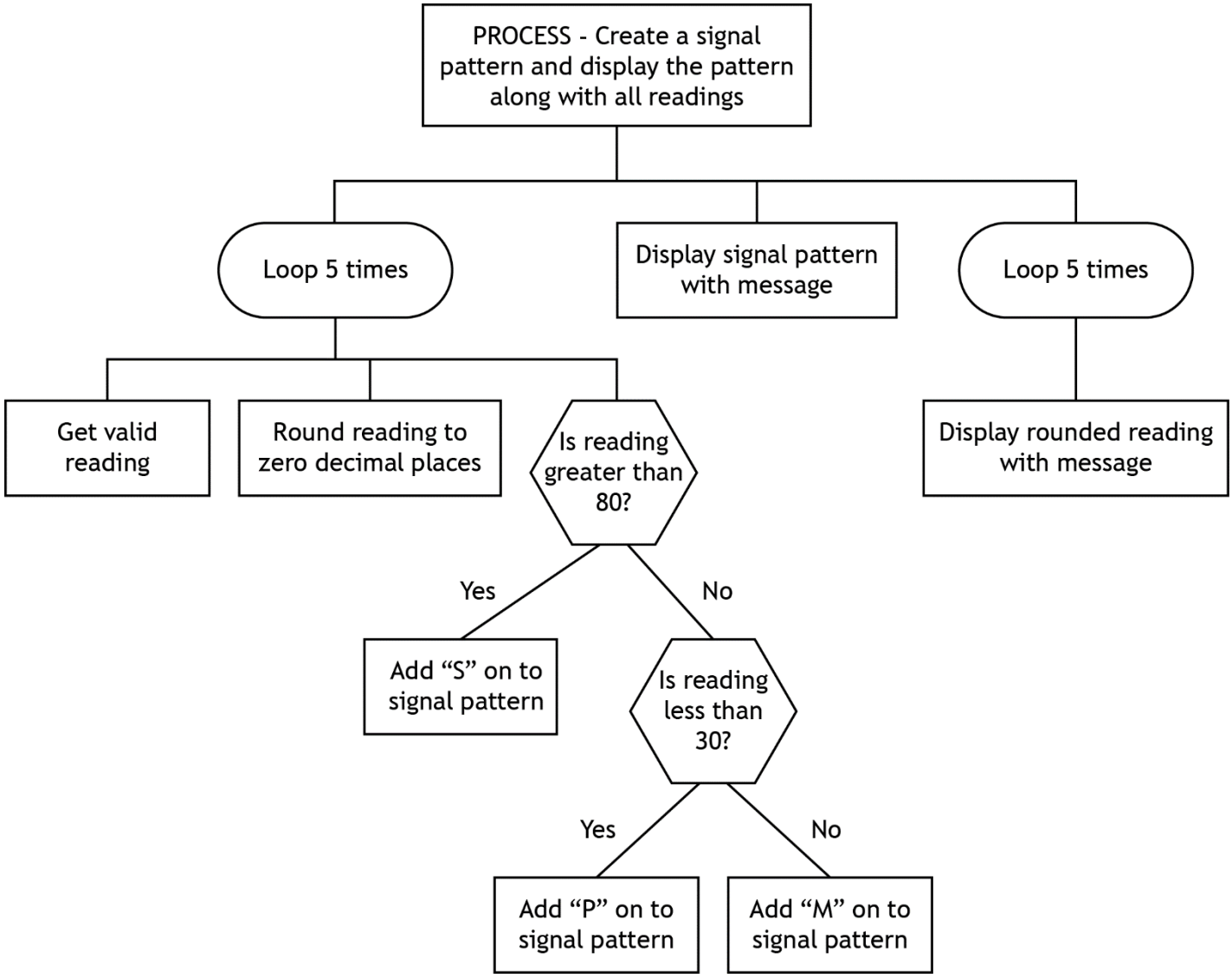
**Processes**

- round each reading to zero decimal places
- create a five character string representing the signal pattern

**Outputs**

- a message displaying the signal pattern
  for example - Signal Pattern is: SSMPS
- the five rounded readings with each reading number
  for example - Reading 1 – 89
  Reading 2 – 82
  Reading 3 – 56
  Reading 4 – 12
  Reading 5 - 99

**Program design (structure diagram)**



## Task 2: software design and development

2a Using the program analysis and design, implement the program in a language of your choice. Ensure the program matches the structure diagram provided.

**(15 marks)**

Print evidence of your program code.

2b Your program should be tested to ensure it produces different signal patterns correctly.

Complete the table below to create one set of test data that will produce the expected output for the signal pattern shown.

**(2 marks)**

| Type of test | User Input | | Expected output for signal pattern | Actual output |
|---|---|---|---|---|
| Normal | reading 1 | | Signal pattern is: MPSPS | Attach printouts of inputs and outputs as evidence. |
| | reading 2 | | | |
| | reading 3 | | | |
| | reading 4 | | | |
| | reading 5 | | | |

You must demonstrate that your program correctly outputs the signal pattern and the rounded readings.

Print evidence of inputs and outputs to show that you have completed the test.

2c Your program should be tested to ensure that each signal strength character is correctly assigned as S, M or P. Six extreme test values are required to test this fully.

State the six test data values required:

**(3 marks)**

Extreme 1 _____

Extreme 2 _____

Extreme 3 _____

Extreme 4 _____

Extreme 5 _____

Extreme 6 _____

Candidate name_____ Candidate number_____

2d With reference to your code, evaluate your program by commenting on the following:

| |
|---|
| Fitness for purpose **(1 mark)** |
| Where your code demonstrates efficient use of programming constructs **(1 mark)** |
| Robustness of your completed program **(1 mark)** |
| Readability of your code **(2 marks)** |

Candidate name_____ Candidate number_____

## Task 3: web design and development

Grieve Crafts builds eco-friendly garden products. They wish to create a web page with the following content:

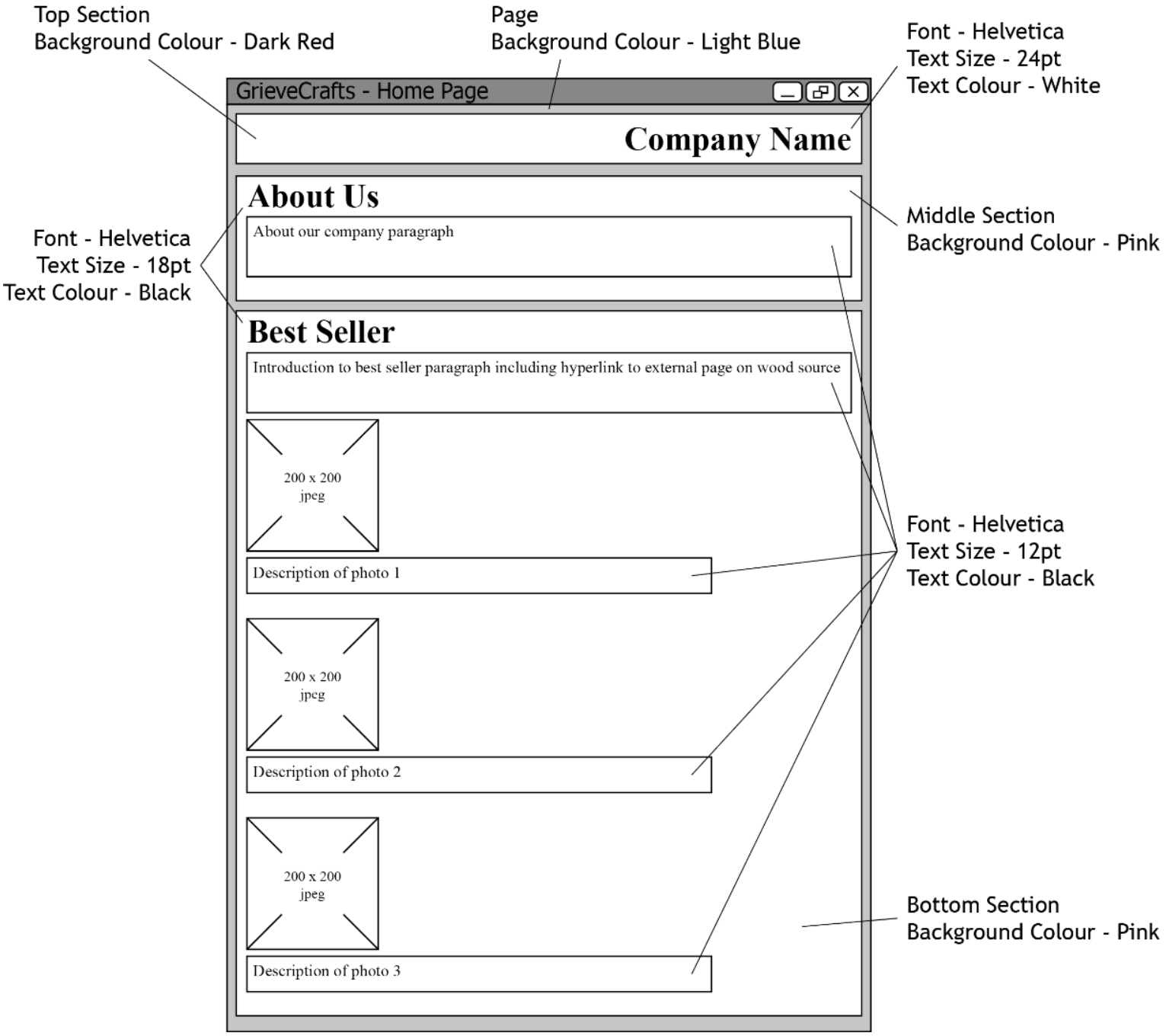
- a coloured top section which includes the company name
- a coloured middle section which includes a heading and short paragraph titled "About our Company"
- a coloured bottom section which include a heading, three photographs showing their most popular product being built and descriptions to accompany the photographs
- an external link to a web page about their wood source.

3a State **two** functional requirements for the web page.

| |
|---|
| Functional requirement 1 **(1 mark)** |
| Functional requirement 2 **(1 mark)** |

3b When designing the web page, Grieve Crafts produced a wireframe and a low-fidelity prototype of the page showing an external link to a web page about the source wood.

The wireframe design of the page (annotated with required styles) is shown below:



The low-fidelity prototype of the page is shown below:

Grieve Crafts

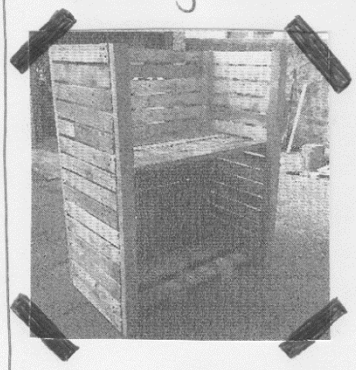
About Our Company

Formed in 2016, Grieve Crafts is an environmentally-friendly company whose products are all made from recycled wood.

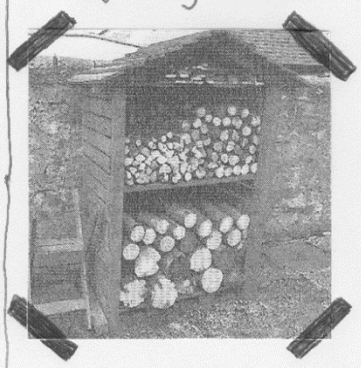
Our Best Seller

Built from recycled wooden pallets our exclusive wood shed is available at a discounted price of £235.

Starting Point: Dismantle four or five old pallets.



Halfway Point: The basic structure is assembled.



Finishing Point: The finished, painted product.

Your teacher/lecturer will provide you with the following three graphic files:

- firstStage.jpg
- middleStage.jpg
- finishedStage.jpg

Implement the design using HTML and CSS. All style information should be placed in an external CSS file as Grieve Crafts may add more web pages in the future.

The web page should include a hyperlink to:
https://en.wikipedia.org/wiki/Pallet

**(8 marks)**

Print evidence of the following:

- HTML file
- CSS file
- Web page showing how it looks in a web browser

*Acknowledgement of Copyright*
Task 1 - RetroClipArt/Shutterstock.com
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