Level 2 Create designs and test software components (7266/7267-201)

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Assignment guide for Candidates
Assignment B

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Level 2 Create designs and test software components (7266/7267-201) Assignment B

Introduction – Information for Candidates

About this document

This assignment comprises part of the assessment for Level 2 Create designs and test software components (7266/7267-201).

Health and safety

You are asked to consider the importance of safe working practices at all times.

You are responsible for maintaining the safety of others as well as your own. Anyone behaving in an unsafe fashion will be stopped and a suitable warning given. You will not be allowed to continue with an assignment if you compromise any of the Health and Safety requirements. This may seem rather strict but, apart from the potentially unpleasant consequences, you must acquire the habits required for the workplace.

Time allowance

The recommended time allowance for this assignment is four hours.

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Candidate instructions

Candidates are advised to read all instructions carefully before starting work and to check with your assessor, if necessary, to ensure that you have fully understood what is required.

Time allowance: 4 hours

Assignment set up: A scenario is provided for candidates in the form of a company specification for a service they require.

This assignment is made up of four tasks

- **Task A** - provides an outline design specification for a software component to validate input.
- **Task B** - provides criteria that should be followed by candidates when producing their design work.
- **Task C** - provides a specification for the software which requires functional testing.
- **Task D** - provides criteria that should be followed by candidates when producing the testing documentation.

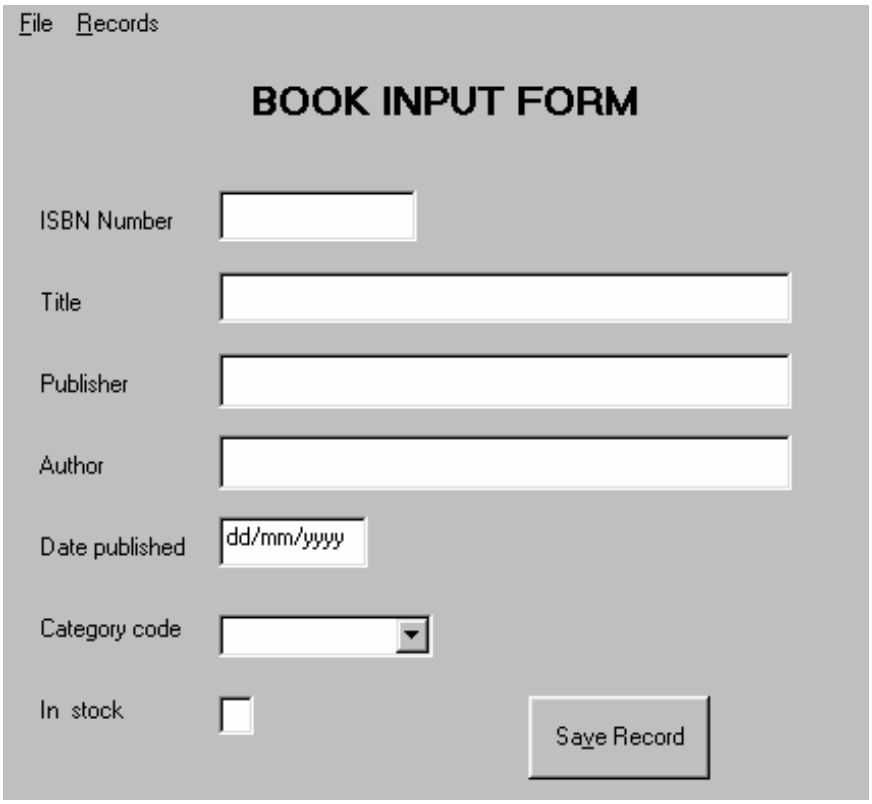
Scenario

A software development company, ACE Development Systems, develop software for use by clients. Software is being developed to create and maintain book details for a book shop. You have been asked to design the software component that validates the input of the book records. You are then required to test the whole program after development.

Task A

Candidates should use the following specification to fulfil the company's requirements.

In this task you are required to design the routines for validation of the book records. The validation routine will be called by another routine. If a field is invalid the appropriate error message must be displayed. When every field in the input form has been accepted control must be passed back to the calling routine. Shown below is the screen input layout for a book record.



The fields and the validation required is shown in the following table.

Field	Validation
ISBN Number	Not empty Modulus 11 Must be 13 characters Numeric
Title	None
Publisher	None
Author	None
Date published	dd/mm/yyyy Full date check
Category code	IT, Garden, Music, Electronics, Fiction, Biology, Chemistry, Maths, Art, Languages, Internet, Education
In stock	Y or N (upper or lower case allowed)

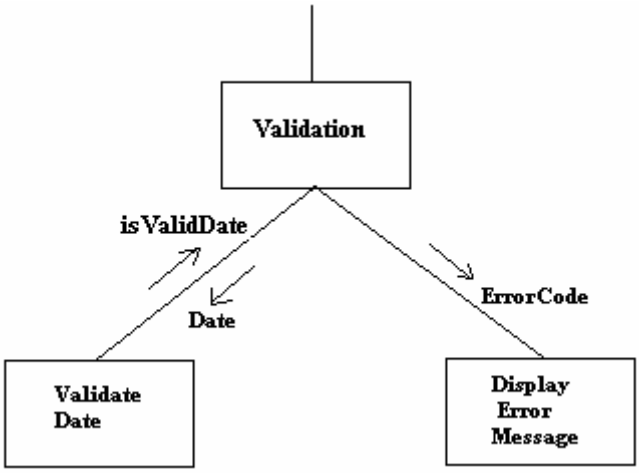
The international standard for allocating reference numbers for published books (ISBN) is based on a 10 character entry (ignoring "-"). The rightmost character may be any number between 0 (zero) to 9 or the character X. The remaining nine characters (leftmost) are always numbers between the value 0 (zero) to 9.
The 10 characters (ignoring "-") are validated by a modulus 11 check. The X character counts as a 10. The program must input the ISBN reference number with hyphens.
Typical examples of ISBN reference numbers are:

0-13-527754-X
0-07-881442-1
0-201-18244-0

0-672-22632-4

For an explanation of a modulus 11 validation check for an ISBN number see Appendix A.

The structure chart for the validation routines is shown below.



1 Use a program design language to produce the design for the validation routines. Perform all validation as required for the design. Any assumptions you make about the design must be documented.

2 Some error codes have already been defined for the software and are shown below with their associated message.

Error Number	Error Message
1	1: ISBN Number is not numeric (ignoring "-")
2	2: ISBN Number is not 13 characters
3	3: ISBN Number is not a valid modulus 11 number
4	4: In stock must be Y or N
5	5: Invalid Date published
6	6: Category code invalid
7	7: File not open

The error codes 8-12 are unassigned and if required can be used for extra error messages for your routines. Document any new error messages used.

If the ISBN Number is empty no error message is to be displayed and any other data entered is not to be saved when the Save Record button is clicked.

Task B

Check that you have followed the criteria below when producing the design for the validation routines:

1 The design conforms to the design specification.

2 The design uses the most appropriate data type(s).

3 The design is consistent and complete.

4 The program design language clearly shows variable names and data types, constants, argument names and data types, return value data types and any data structures used.

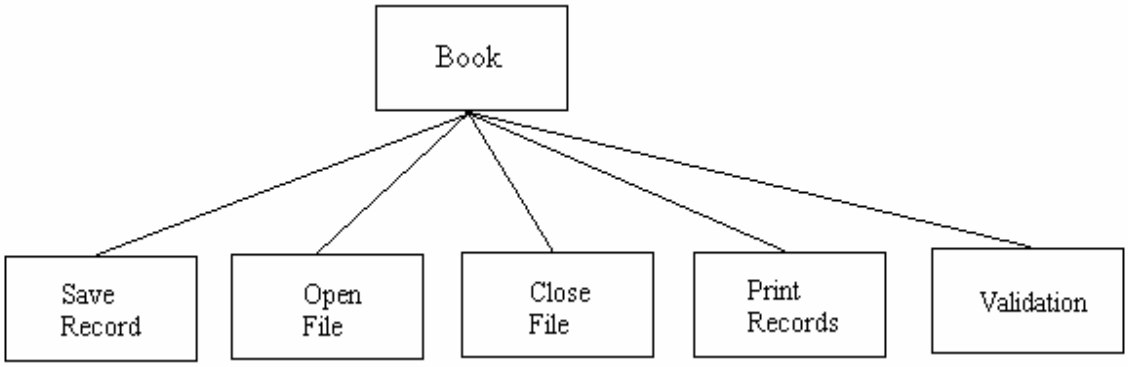
5 The program design language clearly shows the beginning and end of each iteration, selection and routine.

Task C

The software has now been developed and includes the routines for file creation, validation and printing.

In this task you are required to carry out functional testing of the Book.exe software.

The structure of the software routines developed is shown in the following structure chart.



The output file is created as an append file and must be opened using a suitable filename. The file must be opened before data can be entered, validated or saved. The records are written to the file in text format with each individual field as string data terminated with a carriage return. The file can be opened, read and printed using a text editor (eg Notepad).

The print layout for the printed records is shown below.

Book Records
Z9/Z9/Z9

Page Z9

ISBN Number:	XXXXXXXXXXXXX
Title:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Publisher:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Author:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Date published:	99/99/9999
Category code:	XXXXXXXXXXX
In stock:	X

ISBN Number:	XXXXXXXXXXXXX
Title:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Publisher:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Author:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Date published:	99/99/9999
Category code:	XXXXXXXXXXX
In stock:	X

Note: Where 9 represents a digit, X represents an alphanumeric character and Z represents zero suppression.

Six book records must be printed per page and then a new page thrown with a heading.

1 Prepare a test plan to carry out functional testing of the software.

2 Prepare the test data to be used with the test plan.

3 Use the test plan and test data to carry out a series of tests and record the test results in a test log.

4 Operate equipment according to suppliers, manufacturers and/or workplace requirements.

Task D

Check that you have followed the criteria below when producing the testing documentation:

1 The test plan contains a test number, date, purpose and type of test and expected outputs for stated inputs.

2 The test data tests the software execution under normal and exceptional circumstances.

3 Evidence of printed output, screen prints and file output must be cross referenced to the correct test number.

Notes

- Candidates should produce the following for their assessor:
  - Program design language algorithms for the validation routines.
  - Test plan, test data and test log for the testing.
  - Cross referenced evidence of testing ie screen prints, printed output and file output as necessary to show test results.
- At the conclusion of this assignment, hand all paperwork and removable media to the test supervisor.
- Ensure that your name is on the removable media and all documentation.
- If the assignment is taken over more than one period, all removable media and paperwork must be returned to the test supervisor at the end of each sitting.

Modulus 11 check

A modulus 11 check is carried out as follows:

Multiply each digit in the ISBN number, staring at the right, by the number 1, then 2, then 3 etc.

Multiply by	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
ISBN number	0	1	3	5	2	7	7	5	4	X
Result	0	9	24	35	12	35	28	15	8	10

The result of each multiplication is added together.

0 + 9 + 24 + 35 + 12 + 35 + 28 + 15 + 8 + 10 = 176

The result of the addition is then divided by the modulus (11).

176 divided by 11 = 16 reminder 0

If the remainder from the division is 0 the ISBN number is a valid modulus 11 number otherwise the ISBN number is not a valid modulus 11 number.

The remainder is 0 so the ISBN number 013527754X is a valid modulus 11 number.

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