

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/41

Paper 4 (Written Paper), maximum raw mark 75

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

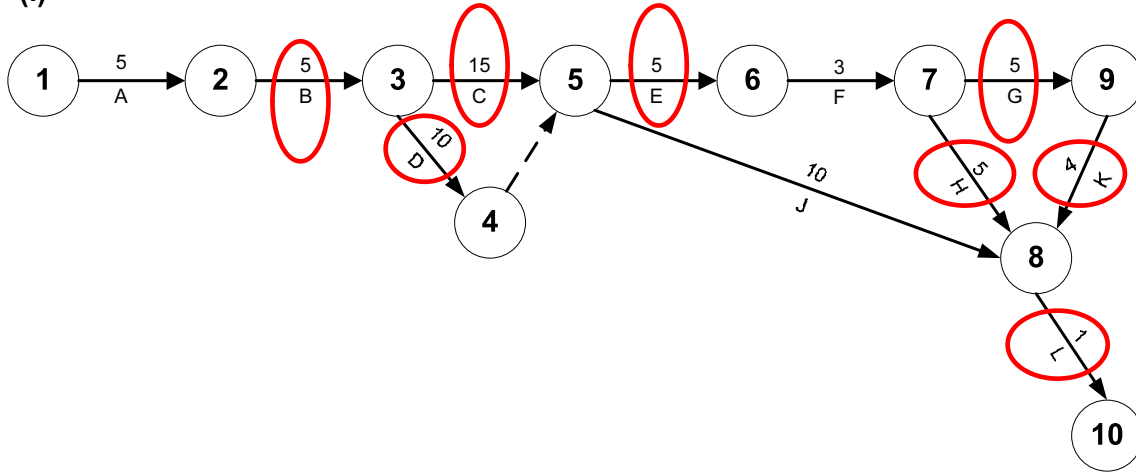
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1 (a) (i)



[max. 7]

(ii) 1 – 2 – 3 – 5 – 6 – 7 – 9 – 8 – 10
 1–5 scores 1
 6–10 scores 1

[2]

(iii) 43 weeks

[1]

(b) (i) week number 25

[1]

(ii) week number 32

[1]

(c) To see what activities can be done in parallel // show dependencies
 To record changes to project timings

[max. 1]

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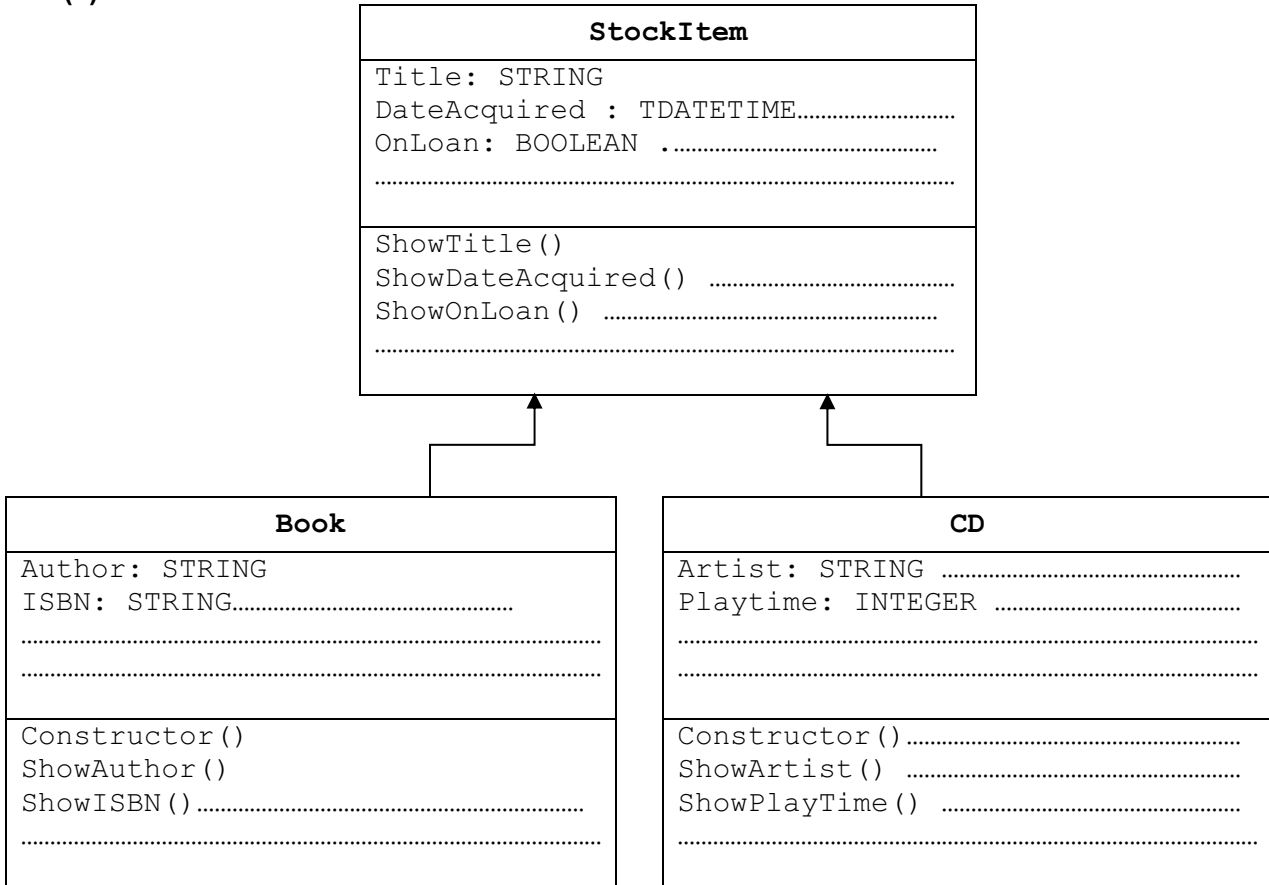
- 2 (a) parent(philippe, meena).
parent(gina, meena). [2]
- (b) ahmed, aisha, raul [2]
- (c) father(F, ahmed). [1]
- (d) mother(X, Y)
IF
female(X) AND parent(X, Y). [2]
- (e) grandparent(W, Z)
IF
**parent(W, X)
AND parent(X, Z).** [2]
- (f) grandfather(G, K)
IF
male(G) AND
grandparent(G, K).

alternative:

father(G, X) AND
parent(X, K). [2]

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3 (a)



[max. 7]

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(b) (i) *Mark as follows:*

Class header
Methods
Properties

Pascal

```
StockItem = CLASS
    PUBLIC
        Procedure ShowTitle();
        Procedure ShowDateAcquired();
        Procedure ShowOnLoan();
    PRIVATE
        Title : STRING;
        DateAcquired : TDateTime;
        OnLoan : Boolean;
END;
```

Python

```
class StockItem :
    def __int__(self) :
        self.__Title = ""
        self.__DateAquired = ""
        self.__OnLoan = False

    def ShowTitle() :
        pass
    def ShowDateAcquired() :
        pass
    def ShowOnLoan() :
        pass
```

VB.NET

```
Class StockItem
    Public Sub ShowTitle()
    End Sub
    Public Sub ShowDateAquired()
    End Sub
    Public Sub ShowOnLoan()
    End Sub
    Private Title As String
    Private DateAquired As Date
End Class
```

[3]

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- (ii) *Mark as follows:*
 Class header and showing superclass
 Methods
 Properties

Pascal

```

TYPE Book = CLASS (StockItem)
  PUBLIC
    Procedure ShowAuthor();
    Procedure ShowISBN();
  PRIVATE
    Author : STRING;
    ISBN : STRING;
END;
```

Python

```

class Book(StockItem) :
    def __init__(self) :
        self.__Author = ""
        self.__ISBN = ""
    def ShowAuthor() :
        pass
    def ShowISBN() :
        pass
```

VB.NET

```

Class Book : Inherits StockItem
  Public Sub ShowAuthor()
  End Sub
  Public Sub ShowISBN()
  End Sub
  Private Author As String
  Private ISBN As String ` reject integer
End Class
```

[3]

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(iii) Pascal

```

NewBook := Book.Create;           1
NewBook.Title := 'Computers';
NewBook.Author := 'A.Nyone';
NewBook.ISBN := '099111';        1
NewBook.DateAcquired := '12/11/2001';
NewBook.OnLoan := FALSE          1

```

Python

```

NewBook = Book()                 1
NewBook.Title = "Computers"
NewBook.Author = "A.Nyone"
NewBook.ISBN = "099111"          1
NewBook.DateAcquired = "12/11/2001"
NewBook.OnLoan = False           1

```

VB.NET

```

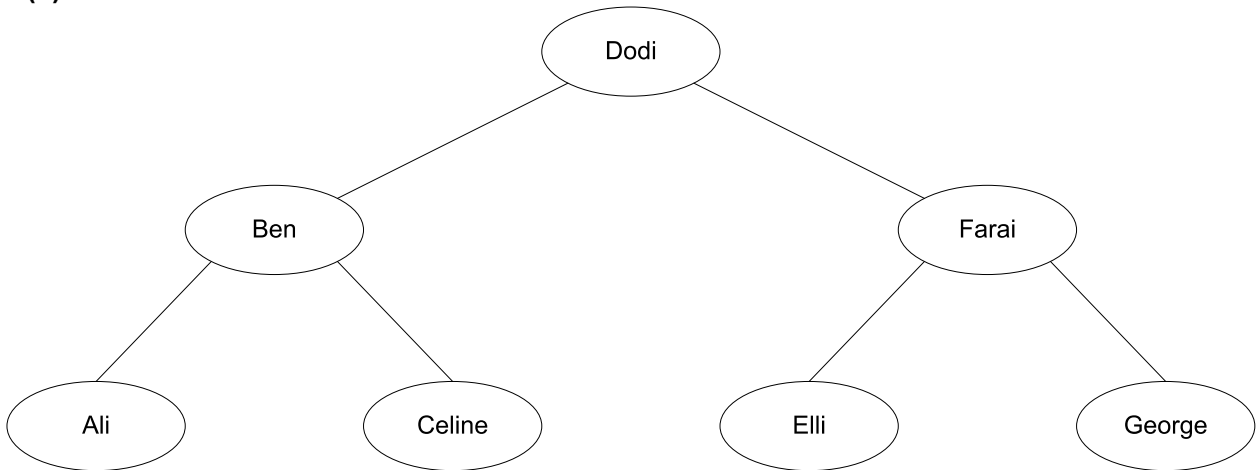
Dim NewBook As Book = New Book() 1
NewBook.Title = "Computers"
NewBook.Author = "A.Nyone"
NewBook.ISBN = "099111"          1
NewBook.DateAcquired = #12/11/2001#
NewBook.OnLoan = False           1

```

[3]

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4 (a)



[4]

(b)

Tree

RootPointer		Name	LeftPointer	RightPointer
<input type="text" value="1"/>	[1]	Dodi	5	2
	[2]	Farai	3	4
	[3]	Elli	0	0
	[4]	George	0	0
	[5]	Ben	7	6
	[6]	Celine	0	0
	[7]	Ali	0	0
	[8]		9	0
	[9]		10	0
	[10]		0	0

FreePointer

[7]

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- (c) (i)

```
01 PROCEDURE TraverseTree (BYVALUE Root : INTEGER)
02     IF Tree[Root].LeftPointer < > 0
03         THEN
04             TraverseTree (Tree[Root].LeftPointer)
05     ENDIF
06     OUTPUT Tree[Root].Name
07     IF Tree[Root].RightPointer < > 0
08         THEN
09             TraverseTree (Tree[Root].RightPointer)
10     ENDIF
11 ENDPROCEDURE
```

 [5]
- (ii) A procedure that calls itself // is defined in terms of itself
Line number: 04/09 [2]
- (iii) TraverseTree (RootPointer) [1]

5 (a)

MembershipFile

Address	MemberID	other member data
0	0	
1	1001	
2	7002	
3	0	
4	0	
5	3005	
6	0	
7	0	
8	0	
:	:	
:	:	
96	4096	
97	0	
98	2098	
99	0	

1001 and 7002 and 3005 1
4096 and 2098 1 [2]

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- (b) (i) 10 // generate record address
 20 NewAddress ← Hash(NewMember.MemberID)
 30 // move pointer to the disk address for the record
 40 SEEK NewAddress
 50 PUTRECORD "MembershipFile", NewMember [4]
- (ii) 01 TRY
 02 OPENFILE "MembershipFile" FOR RANDOM
 03 EXCEPT
 04 OUTPUT "File does not exist"
 05 ENDTRY [2]
- (iii) collisions/synonyms
 The previous record will be overwritten [2]
- (iv) Create an overflow area
 The 'home' record has a pointer to others with the same key
OR
 Store the overflow record at the next available address
 in sequence
OR
 Re-design the hash function
 to generate a wider range of indexes // to create fewer collisions [2]
- (v) 41 GETRECORD "MembershipFile", CurrentRecord
 42 WHILE CurrentRecord.MemberID <> 0
 43 NewAddress ← NewAddress + 1
 44 IF NewAddress > 99 THEN NewAddress ← 0
 45 SEEK NewAddress
 46 GETRECORD "MembershipFile", CurrentRecord
 47 ENDWHILE [max. 4]