

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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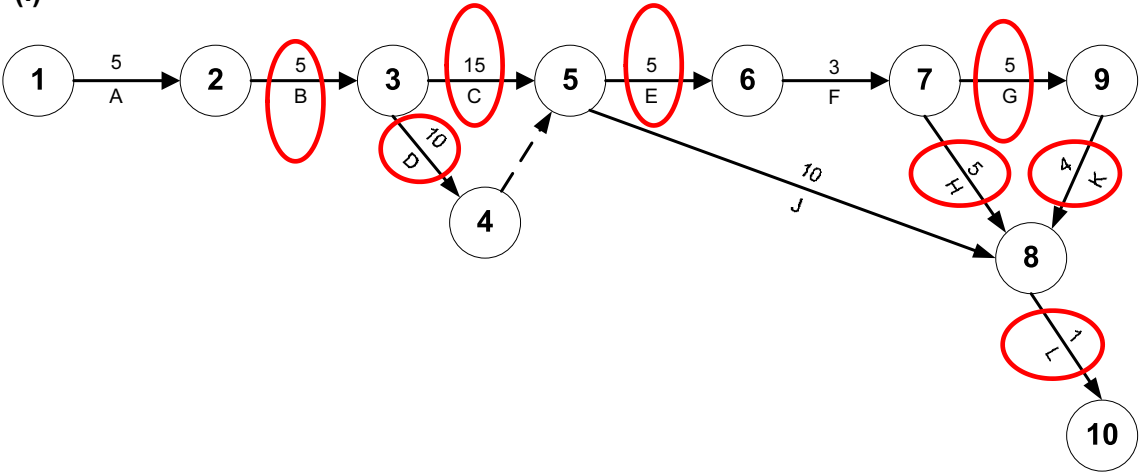
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1 (a) (i)



[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

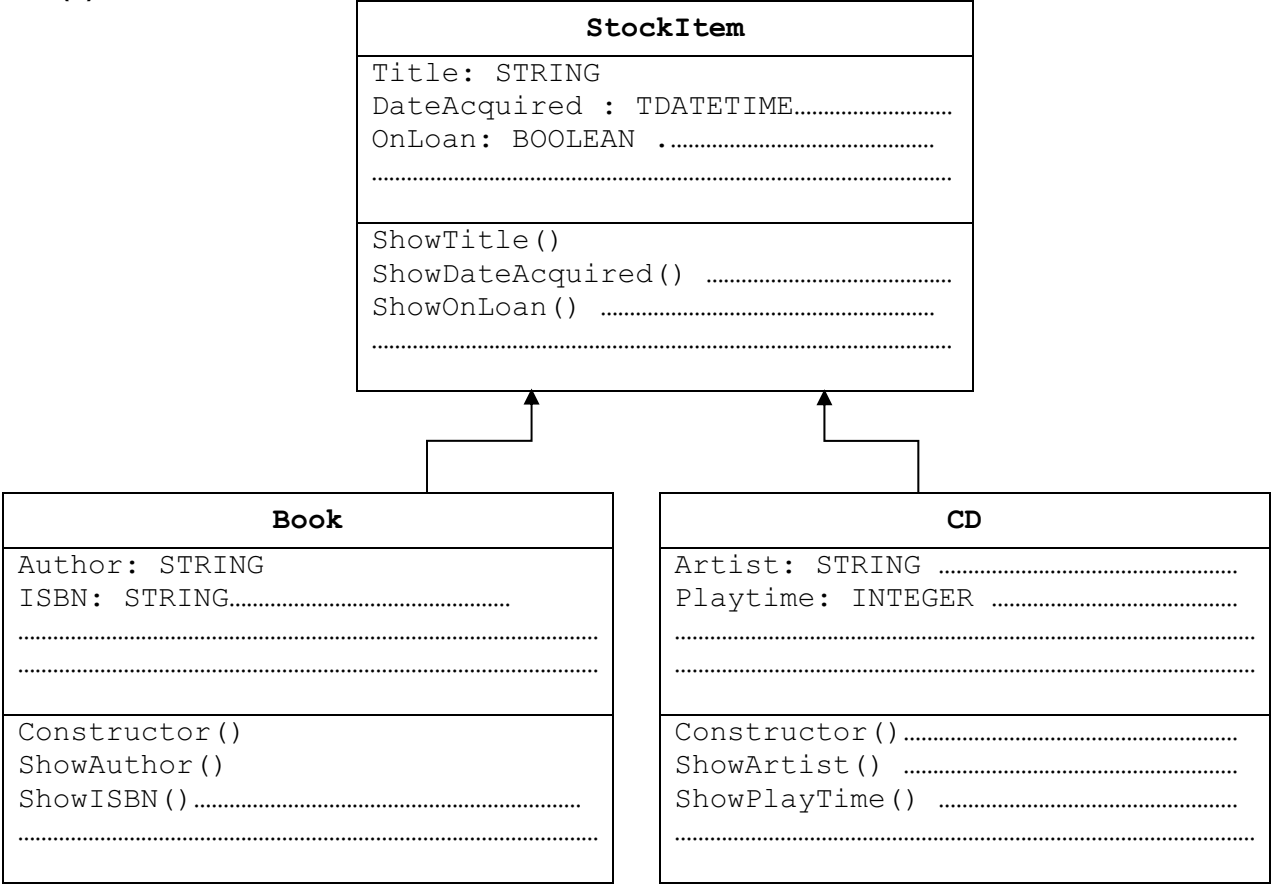
[max. 1]

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

```

1

1

1

Python

```

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

```

1

1

1

VB.NET

```

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

```

1

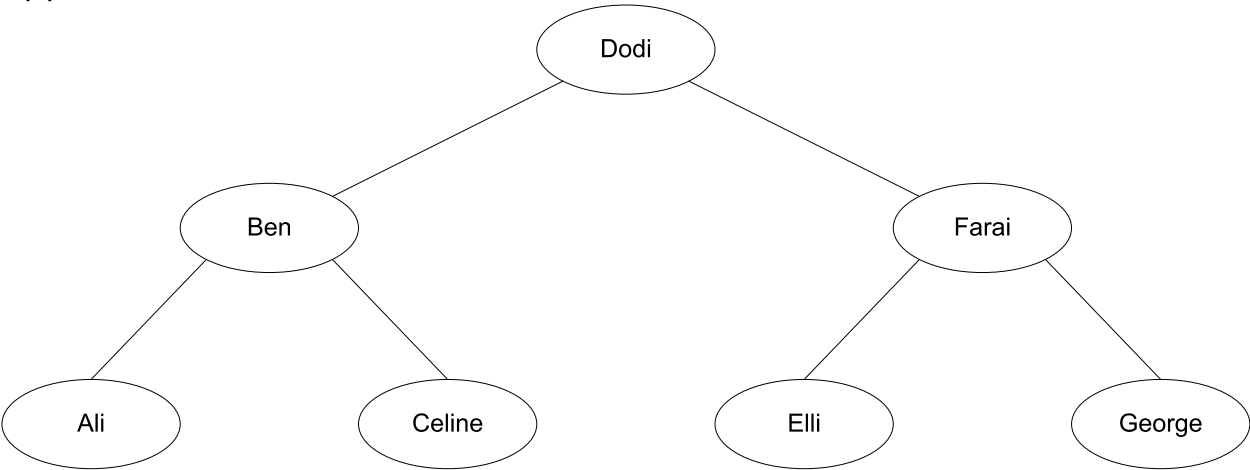
1

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[3]

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4 (a)



[4]

(b)

Tree			
RootPointer		Name	LeftPointer RightPointer
1	[1]	Dodi	5 2
	[2]	Farai	3 4
	[3]	Elli	0 0
	[4]	George	0 0
FreePointer 8	[5]	Ben	7 6
	[6]	Celine	0 0
	[7]	Ali	0 0
	[8]		9 0
	[9]		10 0
	[10]		0 0

[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]