

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/42

Paper 4 (Written Paper), maximum raw mark 75

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1 (a) (i)

Activity																																						
A	■																																					
B		■																																				
C			■	■	■	■	■	■	■	■																												
D										■	■																											
E											■	■																										
F													■	■	■																							
G																■	■																					
H			■																																			
J				■	■	■																																
K											■	■	■	■																								
L																■	■																					
M																																						
N																																						
Week Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29									

1 mark for each square [2]

(ii) week number 18

Allow follow through [1]

(b) (i)

Activity	Description	Weeks to complete
A	Write requirement specification	1
B	Produce program design	1
C	Write module code	7
D	Module testing	2
E	Integration testing	2
F	Alpha testing	2
G	Install software and carry out acceptance testing	2
H	Research and order hardware	1
J	Install delivered hardware	3
K	Write technical documentation	4
L	Write user training guide	2
M	Train users on installed hardware and software	1
N	Sign off final system	1

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
A	█																														
B		█																													
C			█	█	█	█	█	█	█	█			█	█																	
D									█	█			█	█																	
E										█	█					█	█														
F																	█	█													
G																								█	█						
H			█																												
J																															
K																	█	█	█	█											
L																									█	█					
M																															
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Week Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		

1 mark per activity (but 1 mark for activity M and N)

Notes:

C must be after E (1 or 2 later is ok)

D, E, F correct relative to C

J must start in week 20 (allow 21, 22)

G must come after the end of J (f.t.)

K finishes after or at same time as F

L finishes at the same time as G **and after the end of J** (or 1-2 weeks later)

M starts **when everything else has finished**. N after or at same time as M

[9]

(ii) week number: 26

Allow f.t.

[1]

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2 (a) parent(ali, ahmed).
parent(meena, ahmed).

Accept statements in either order
Wrong capitalisation minus 1 mark

[2]

(b) P =
ahmed
aisha

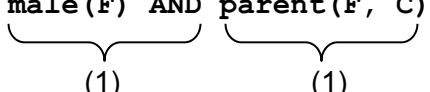
Ignore capitalisation
Deduct 1 mark for every extra result

[2]

(c) mother(M, gina).

Accept parent(M, gina) AND female(M). Accept a comma instead of AND
Reject mother(M, gina) IF female(M) AND parent(M, gina).
Ignore capitalisation

[1]

(d) father(F, C)
IF
male(F) AND parent(F, C).


[2]

(e) brother(X, Y)
IF
male(X) AND
parent(A, X) AND
parent(A, Y)
AND NOT X=Y.

[1]

[1]

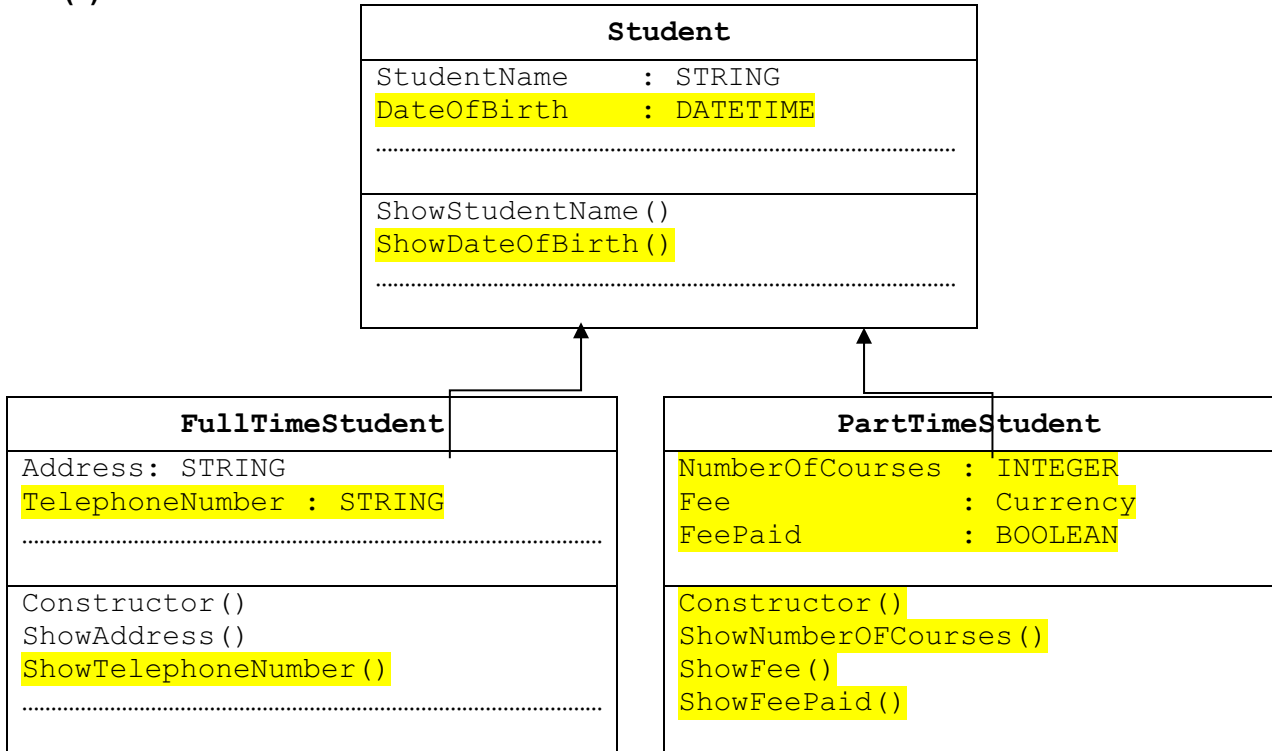
[1]

[1]

Accept any variable for A, but it must be the same in both places
Accept father/mother instead of parent
Ignore capitalisation

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3 (a)



Mark as follows:

Base class:

- dateOfBirth declaration and associated method in Student
- constructor

Subclasses:

- telephoneNumber declaration and associated method in FullTimeStudent
- NumberOfCourses declaration and associated method in PartTimeStudent
- fee declaration and associated method in PartTimeStudent
- feepaid declaration and associated method in PartTimeStudent
- constructor method in PartTimeStudent
- inheritance arrows

Ignore data types, ignore other methods/attributes
Ignore brackets after methods

[Max 7]

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(b) (i) Mark as follows (parts to be ignored in grey):

If no programming language stated, map to 1 of the 3 below (or check in Q1ai)

Class header & ending (watch out these may be squashed into the next clip)

Ignore methods

2 attributes with correct data types

No mark if subclass properties shown here

Attributes required:

StudentName

DateOfBirth (accept variations e.g. DoB)

Pascal

```

TYPE Student = CLASS
  PUBLIC
    Procedure ShowStudentName();
    Procedure ShowDateOfBirth();
  PRIVATE
    StudentName : STRING;
    DateOfBirth : TDateTime; // accept string    reject Date
END;
```

Python

```

class Student :
    def __init__(self) :
        self.StudentName = ""
        self.DateOfBirth = "" # date(1,1,2015)
    def ShowStudentName() :
        pass
    def ShowDateOfBirth() :
        pass
```

Ignore `__` before attributes

VB.NET

```

Class Student
  Public Sub ShowStudentName()
  End Sub
  Public Sub ShowDateOfBirth()
  End Sub
  Private StudentName As String
  Private DateOfBirth As Date ` accept string
End Class
```

(Ignore: must inherit)

Ignore Private/protected/public

Don't give a mark if using DIM

[2]

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(ii) Mark as follows:

- Class header and showing superclass
- Properties (Do not award this mark if properties from base class included here)
Data types must be correct
- Methods (Do not award this mark if methods from base class included here)
must show heading and ending of procedure/function declaration
Ignore PUBLIC, PRIVATE

Pascal

```
TYPE FullTimeStudent = CLASS (Student)
  PUBLIC
    Procedure ShowAddress();
    Procedure ShowTelephoneNumber();
  PRIVATE
    Address          : STRING;
    TelephoneNumber : STRING; // reject integer
END;
```

Python

```
class FullTimeStudent(Student) :
    def __init__(self) :
        self. Address = ""
        self. TelephoneNumber = ""
    def ShowAddress() :
        pass
    def ShowTelephoneNumber() :
        pass
```

VB.NET

```
Class FullTimeStudent : Inherits Student
  Public Sub ShowAddress()
  End Sub
  Public Sub ShowTelephoneNumber()
  End Sub
  Private Address As String
  Private TelephoneNumber As String ` reject integer
End Class
```

No mark if using DIM

[3]

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- (iii) 1 mark per statement to max 3
Missing string delimiters: penalise once
Accept use of constructor

Pascal

```
NewStudent := FullTimeStudent.Create;
NewStudent.StudentName := 'A.Nyone';
NewStudent.DateOfBirth := EncodeDate(1990, 11,12);//:=
'11/12/1990'
NewStudent.TelephoneNumber := '099111';
```

Alternative

```
NewStudent := FullTimeStudent.Create('A.Nyone', '12/11/1990',
'099111');
```

Python

```
NewStudent = FullTimeStudent()
NewStudent.StudentName = "A.Nyone"
NewStudent.DateOfBirth = "12/11/1990"
NewStudent.TelephoneNumber = "099111"
```

Alternative

```
NewStudent = FullTimeStudent('A.Nyone', '12/11/1990', '099111')
```

VB.NET

```
Dim NewStudent As FullTimeStudent = New FullTimeStudent()
NewStudent.StudentName = "A.Nyone"
NewStudent.DateOfBirth = #11/12/1990#
NewStudent.TelephoneNumber = "099111"
```

Alternative

```
Dim NewStudent As FullTimeStudent = New
FullTimeStudent("A.Nyone", "12/11/1990", "099111")
```

[Max 3]

4 (a) FUNCTION Hash(**Key** : STRING) RETURNS INTEGER
 DECLARE Number : INTEGER
 Number ← ASCII(LEFTSTRING(**Key**,1))
 // Number ← ASCII(**Key**[1])
 Number ← Number - 64
 RETURN Number
 // Result ← Number // Hash ← Number
 ENDFUNCTION

Accept ASC instead of ASCII

Accept LEFT instead of LEFTSTRING

Key can be a different identifier but must be the same in both places

[5]

(b) (i)

Index	Dictionary Key	Value
1		
2		
3	Computer	Rechner
4	Disk	Platte
5	Error	Fehler
6	File	Datei
7		
8		
:	:	:
:	:	:
1999		
2000		

Ignore spelling mistakes

1 mark for 2 correct pairs entered in correct slots

[2]

(ii) Collision / synonym / space already occupied / same index in array
 Overwrites previous key-value pair

reject error

[Max 2]

(iii) Create an overflow area

The 'home' record has a pointer to others with the same key // linked list

OR

Store the overflow record at the next available address ...

in sequence (= next available)

OR

Re-design the hash function // write a different/another algorithm

to generate a wider range of indexes // enlarging storage space // to create fewer collisions

[2]

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- 6 (a) 1 mark for structure header/ending
1 mark for each field correct, take away 1 mark for additional fields
Python answers will use a class

Pascal

```
TYPE StockItem = RECORD
    ProductCode      : String;    // accept integer
    Price             : Currency; // accept real
    NumberInStock    : Integer;
END;
```

Python

```
class StockItem :
    def __init__(self) :
        self.ProductCode = ""      # = 0
        self.Price = 0.0           # = 0
        self.NumberInStock = 0
```

VB.NET

```
STRUCTURE StockItem
    Dim ProductCode As String    \ accept integer
    Dim Price As Decimal         \ Double/single
    Dim NumberInStock As Integer
END STRUCTURE
```

VB6

```
Type StockItem
    ProductCode As String        \ accept integer
    Price As Currency           \ Double/single
    NumberInStock As Integer
END Type
```

[4]

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(b) (i) 01 TRY
02 OPENFILE "StockFile" FOR READ/RANDOM // ignore "
03 EXCEPT
04 OUTPUT "File does not exist"
05 ENDRY [2]

(ii) (Line 01) alerts system to check for possible run-time errors (exception)
(Lines 03, 04) handle the exception without the program crashing // keeps program running// provide alternative statements to execute to avoid run-time error

Accept "exception handling" for 1 mark [Max 2]

(c) WHILE NOT EOF("StockFile")
 READFILE "StockFile", ThisStockItem // accept reading separate
fields
 OUTPUT ThisStockItem.ProductCode
 OUTPUT ThisStockItem.NumberInStock
ENDWHILE

1 mark for loop (accept REPEAT)
1 mark for EOF("StockFile") // StockFile.Peek <> -1 / NONE/"
1 mark for READ record
1 mark for OUTPUT of 2 fields

Ignore opening and closing file [4]