

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Level

## **MARK SCHEME for the May/June 2015 series**

### **9608 COMPUTER SCIENCE**

**9608/43**

Paper 4 (Written Paper), maximum raw mark 75

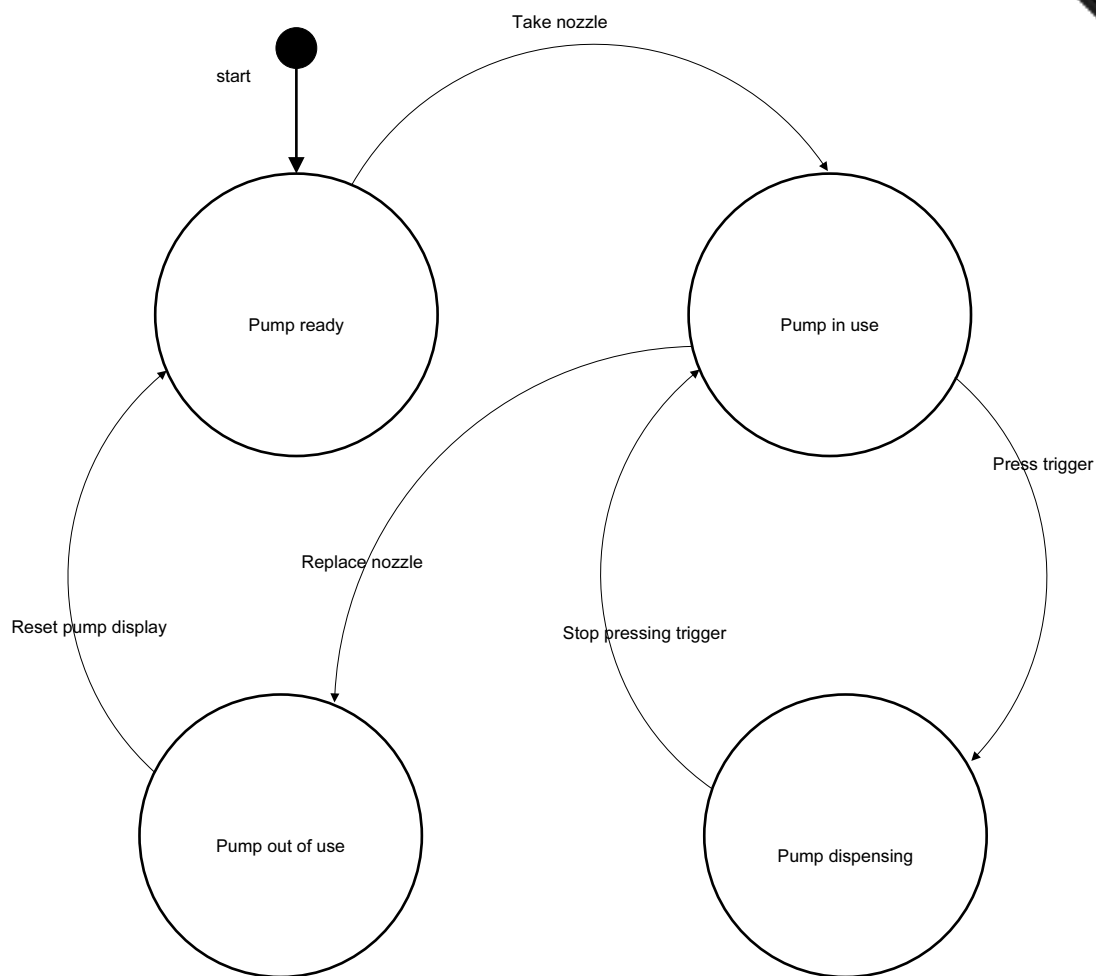
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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

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1



[9]

- 2 (a) `made_with(laasi, milk).`  
`made_with(laasi, yogurt).`  
`dairy_product(milk).`  
`dairy_product(yogurt).`

[4]

- (b) `Ingredient =`  
`cheese, egg, flour`

[2]

- (c) `contains_meat(Dish)`  
`IF`  
`made_with(Dish, X)`  
`AND`  
`meat(X)`

(2 marks)

(1 mark)

(1 mark)

[4]

3 (a)

Conditions	Age under 25	Y	Y	Y	Y	N	N	N	N
	Previous accident	Y	Y	N	N	Y	Y	N	N
	Licence held for 3 or more years	Y	N	Y	N	Y	N	Y	N
Actions	10% extra cost		X						
	No discount	X			X	X	X		
	5% discount			X				X	X
		1 mark	1 mark	1 mark	1 mark	1 mark		1 mark	

[6]

(b)

Conditions	Age under 25	Y	Y	Y	Y	N	N		
	Previous accident	Y	Y	N	N	Y	N		
	Licence held for 3 or more years	Y	N	Y	N	-	-		
Actions	10% extra cost		X						
	No discount	X			X	X			
	5% discount			X			X		
		1 mark				1 mark	1 mark		

[3]

(c) Example Pascal

```

FUNCTION CostPercentageChange(DriverAge : INTEGER;
    HadAccident : BOOLEAN; YearsLicenceHeld : INTEGER) : INTEGER;
BEGIN
    IF DriverAge >= 25
    THEN
        IF HadAccident = TRUE
        THEN
            CostPercentageChange := 0
        ELSE
            CostPercentageChange := -5
        ELSE
            IF HadAccident = TRUE
            THEN
                IF YearsLicenceHeld < 3
                THEN
                    CostPercentageChange := 10
                ELSE
                    CostPercentageChange := 0
                ELSE
                    IF YearsLicenceHeld < 3
                    THEN
                        CostPercentageChange := 0
                    ELSE
                        CostPercentageChange := -5;
            END;

```

Example Python

```

def CostPercentageChange(DriverAge, HadAccident, YearsLicenceHeld) :
    if DriverAge >= 25:
        if HadAccident:
            return 0
        else:
            return -5
    else:
        if HadAccident:
            if YearsLicenceHeld < 3:
                return 10
            else:
                return 0
        else:
            if YearsLicenceHeld < 3:
                return 0
            else:
                return -5;

```

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Mark as follows:

Correct function header

Correct IF statement (1)

Correct IF statement (2)

Correct IF statement (3)

Correct IF statement (4)

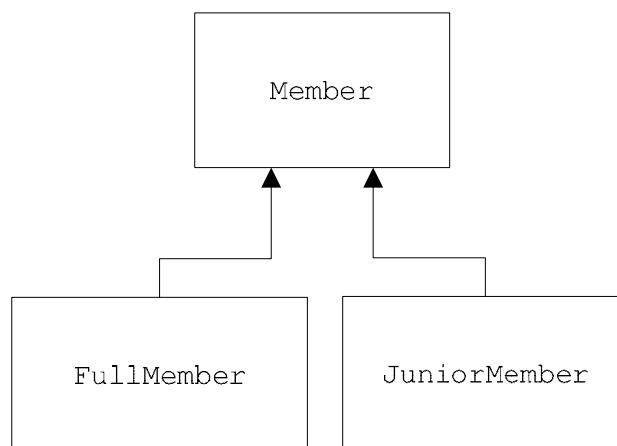
Correct IF statement (5)

Correct return statement (or equivalent)

OR equivalent demonstrating correct logic

[max 6]

4 (a)



[3]

(b) Example Pascal

```

Member = CLASS
  PUBLIC
    Procedure SetMemberName;
    Procedure SetMemberID;
    Procedure SetSubscriptionPaid;
  PRIVATE
    MemberName      : STRING;
    MemberID        : STRING;
    SubscriptionPaid : Boolean;
END;
```

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### Example Python

```
class Member() :
    def __init__(self):          PUBLIC
        self.__MemberName = ""
        self.__MemberID = ""
        self.__SubscriptionPaid = False
    def SetMemberName(self, Name):
        self.MemberName = Name
    def SetMemberID(self, ID):
        self.MemberID = ID
    def SetSubscriptionPaid(self, Paid):
        self.SubscriptioPaid = Paid
```

*Mark as follows:*

Class header	(1 mark)
Public and Private used correctly	(1 mark)
MemberName + MemberID	(1 mark)
SubscriptionPaid	(1 mark)
Methods × 3	(1 mark)

**[5]**

### (c) (i) Example Pascal

```
JuniorMember = CLASS (Member)
    PUBLIC
        Procedure SetDateOfBirth;
    PRIVATE
        DateOfBirth : DateTime;
    END;
```

### Example Python

```
class JuniorMember (Member):
    def __init__ self:
        super().__init__()
        self.DateOfBirth = ""
    def SetDateOfBirth(self, Date):
        self.DateOfBirth = Date
    def SetMemberName(self, Name):
        super().SetMemberName(Name)
    def SetMemberID(self, ID):
        super().SetMemberID(ID)
    def SetSubscriptionPaid(self, Paid):
        super().SetSubscriptioPaid(Paid)
```

**[3]**

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(ii) Example Pascal

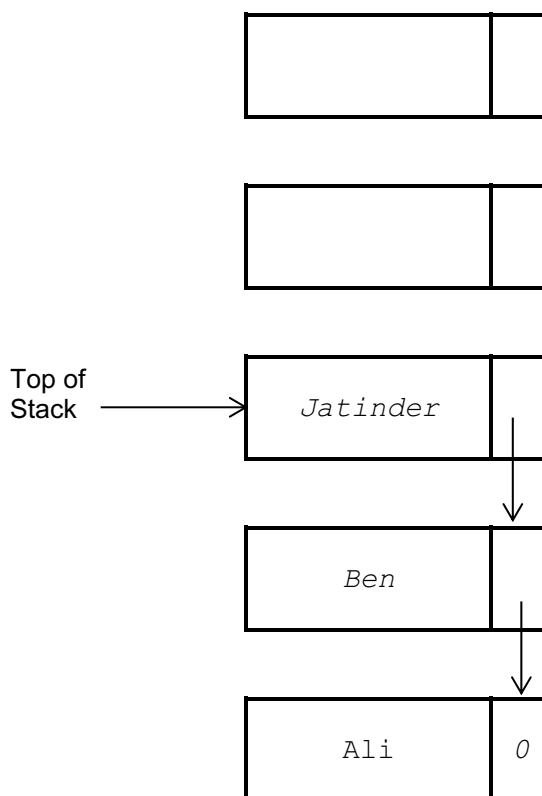
```
NewMember := JuniorMember.Create;           (1 mark)
NewMember.SetMemberName('Ahmed');
NewMember.SetMemberID('12347');              (1 mark)
NewMember.SetSubscriptionPaid(TRUE);
NewMember.SetDateOfBirth("12/11/2001");     (1 mark)
```

Example Python

```
NewMember := JuniorMember()                 (1 mark)
NewMember.SetMemberName("Ahmed")
NewMember.SetMemberID("12347")              (1 mark)
NewMember.SetSubscriptionPaid(TRUE)
NewMember.SetDateOfBirth("12/11/2001")     (1 mark)
```

[3]

5 (a)



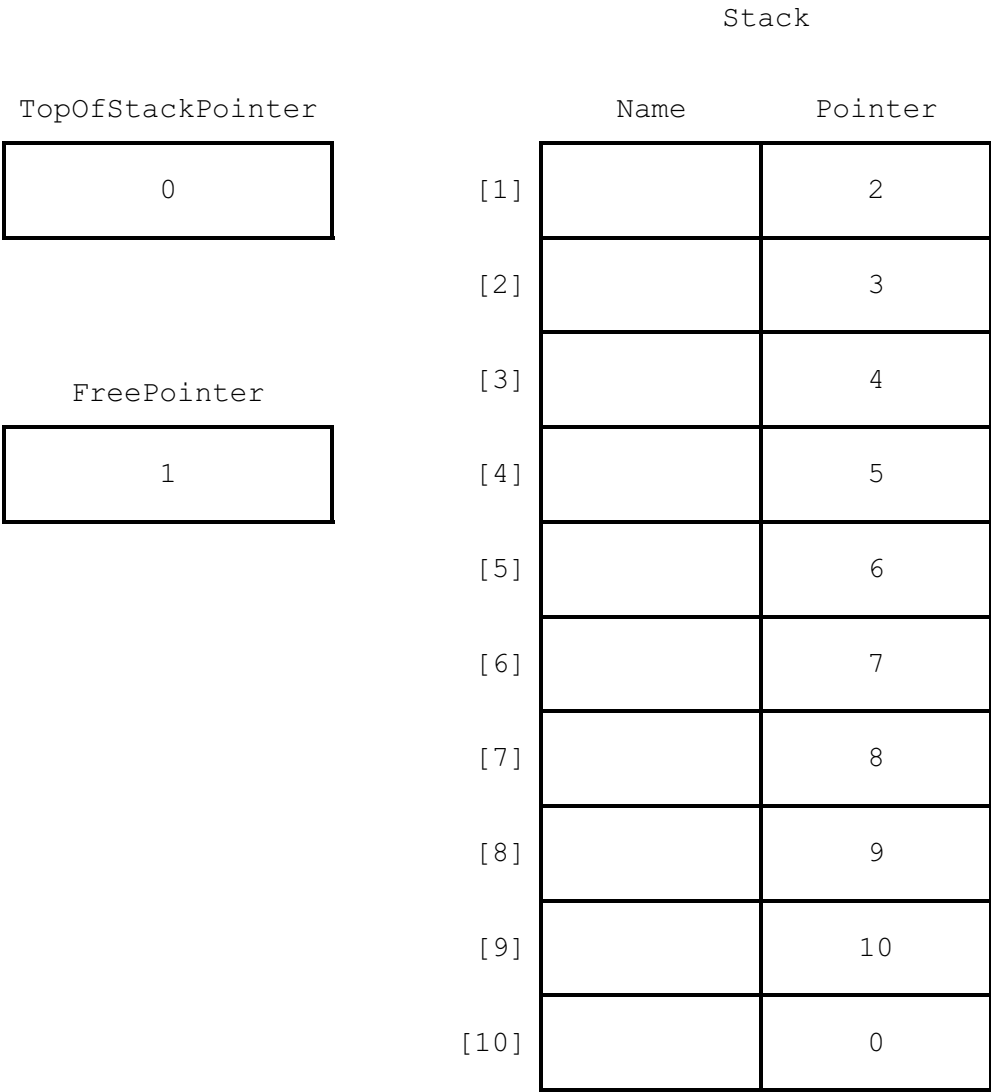
1 mark for Top of Stack pointer

1 mark for 3 correct items

1 mark for correct order with null pointer in last node

[3]

(b) (i)



Mark as follows:  
TopOfStackPointer  
FreePointer  
Pointers[1] to [9]  
Pointer[10]

[4]

(ii) PROCEDURE Pop()  
 // Report error if Stack is empty  
 { IF TopOfStackPointer = 0  
   THEN  
     Error  
   ELSE  
     OUTPUT Stack[TopOfStackPointer].Name  
     // take a copy of the current top of stack pointer  
     TempPointer ← TopOfStackPointer  
     // update the top of stack pointer  
     TopOfStackPointer ← Stack[TempPointer].Pointer  
     // link released node to free list  
     Stack[TempPointer].Pointer ← FreePointer  
     FreePointer ← TempPointer  
   ENDIF  
 }  
 ENDPROCEDURE

1 mark for each line of code as above (first 4 lines + ENDIF for 1 mark)

[Max 5]

6 (a) A procedure that calls itself // is defined in terms of itself [1]

(b) Before procedure call is executed current state of the registers/local variables is saved onto the stack  
 When returning from a procedure call the registers/local variables are re-instated [2]

(c)

Call number	n	(n=0) OR (n=1)	n DIV 2	n MOD 2
1	40	FALSE	20	0
2	20	FALSE	10	0
3	10	FALSE	5	0
4	5	FALSE	2	1
5	2	FALSE	1	0
6	1	TRUE		

1 mark

1 mark

1 mark

OUTPUT 101000 – 1 mark for each pair of bits.

[6]

(d) Conversion of denary number into binary [1]

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**(e) (i) Example Pascal**

```

Procedure X(n: INTEGER)
BEGIN
  IF (n = 0) OR (n = 1)
  THEN
    Write(n)
  ELSE
    BEGIN
      X(n DIV 2);
      Write(n MOD 2);
    END;
  END;
END;

```

**Example Python**

```

def X(n):
    if (n == 0) or (n == 1):
        print(n, end="")
    else:
        X(n // 2)
        print(n % 2, end="")

```

*Mark as follows:*

*Procedure heading & ending*

*Boolean expression*

*correctly grouped statements within ELSE*

*recursive call*

*Using DIV and MOD correctly*

**[5]**