

**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

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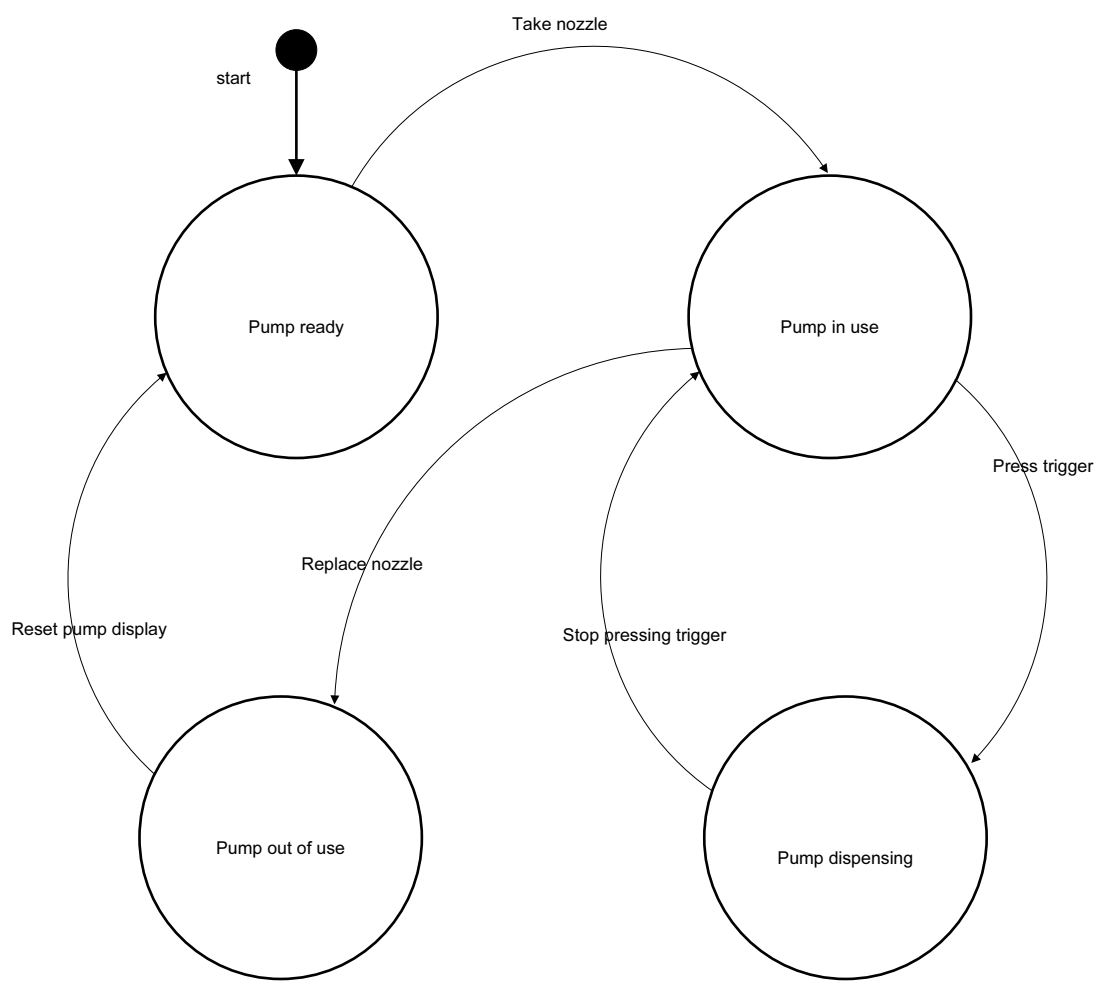
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1



[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)` (2 marks)  
 AND (1 mark)  
`meat(X)` (1 mark)

[4]

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3 (a)

<b>Conditions</b>	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
<b>Actions</b>	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)

<b>Conditions</b>	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	-	-		
<b>Actions</b>	10% extra cost		X						
	No discount	X			X	X			
	5% discount			X			X		
		1 mark				1 mark	1 mark		

[3]

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### (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)

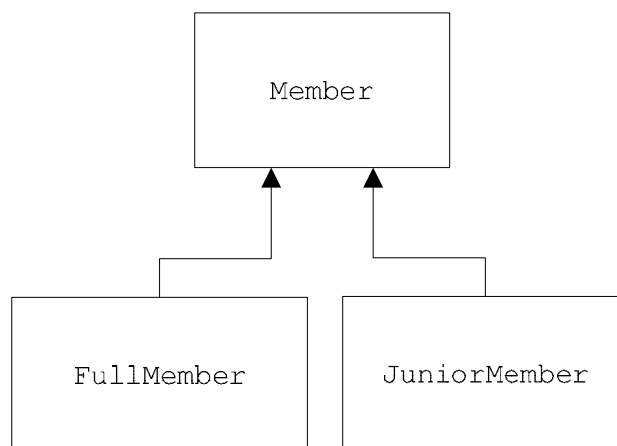
Correct IF statement (5)

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

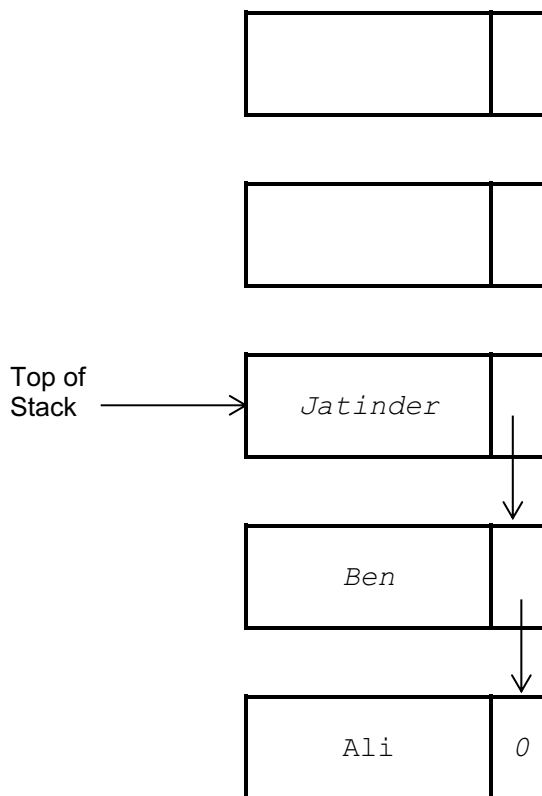
```
NewMember := JuniorMember.Create;           (1 mark)
NewMember.SetMemberName('Ahmed');
NewMember.SetMemberID('12347');             (1 mark)
NewMember.SetSubscriptionPaid(TRUE);
NewMember.SetDateOfBirth("12/11/2001");    (1 mark)
```

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)



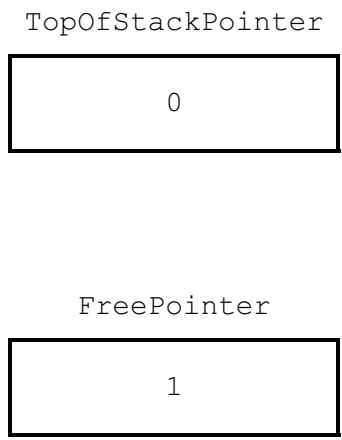
1 mark for Top of Stack pointer  
 1 mark for 3 correct items  
 1 mark for correct order with null pointer in last node

[3]

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(b) (i)

Stack



	Name	Pointer
[1]		2
[2]		3
[3]		4
[4]		5
[5]		6
[6]		7
[7]		8
[8]		9
[9]		10
[10]		0

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

[4]



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```

(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]**