



Immanuel College

Specimen paper for entry into Year 12

Computer Science

Time allowed: 1 hour

Total Marks: 65

Answer ALL questions

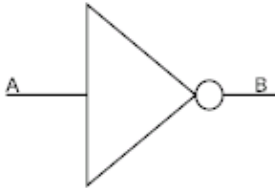
1. Logic gates

Logic gates use Boolean logic which has only two states. These are normally represented by either 1, 0; True, False or Yes/No. As circuit gates have two states (on/off) we can represent binary circuits. (18 marks)

Complete the truth tables to the right on Diagram A and B

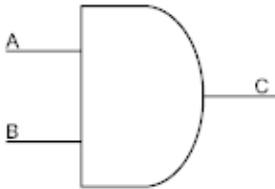
Diagram A

NOT Gate - This gate makes the output the opposite of the input



A	Output B
0	
1	

AND Gate - This gate needs both inputs to be 1 for the output to be 1



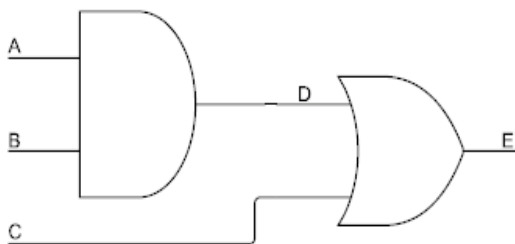
A	B	Output C
0	0	
0	1	
1	0	
1	1	

OR Gate - This gate needs at least one input to be 1 for the output to be 1



A	B	Output C
0	0	
0	1	
1	0	
1	1	

Diagram B



A	B	C	D	E
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

2. Algorithm

The following algorithm describes the behaviour of a monster in a computer game. By default, the monster walks back and forth a platform. If the player is nearby, the monster will jump in the air and throw a bomb. Rearrange the pseudocode so that the segment is correct.

(10 marks)

throw bomb ELSE if landed
END IF ELSE
ELSE Measure Distance to player
END IF END WHILE
Move in the air IF at top of jump THEN
WHILE alive IF state is equal to JUMPING
Set state to WALKING END IF
IF close to edge of platform THEN Turnaround
Set state to JUMPING END IF
IF Distance > 200 pixels Walk in current direction

1. Write the pseudocode for a program that will:

Ask the user to input a student grade. If the grade is 70 or above then display, *you have passed*. Otherwise, it will display, *sorry, you have not passed*.

(6 marks)

2. The source code on the left is correct. On the right, circle the mistakes on the source code. (5 marks)

```
Module ConvertTemperature
  Sub Main()
    Console.WriteLine("Enter temperature in
    celsius: ")

    Dim celsius As Integer =
    Console.ReadLine()
    Dim fahrenheit As Integer = ((celsius *
    9) / 5) + 32
    Console.WriteLine("\nThe temperature
    in fahrenheit
    is: " & fahrenheit & "F")
    If (celsius < 10) Then
      Console.WriteLine("Brrr...
      that's cold!")
    ElseIf (celsius < 20) Then
      Console.WriteLine("That's
      fairly warm.")
    Else
      Console.WriteLine("Hot, hot,
      hot!")
    End If
  End Sub
End Module
```

```
Module ConvertTemperature
  Sub Main()
    Console.WriteLine("Enter temperature in
    celsius: ")

    Dim celsius As Integer =
    Console.ReadLine()
    Dim fahrenheit As Integer = ((celsius * 9)
    \ 5) + 32
    Console.WriteLine("\nThe temperature
    in fahrenheit
    is: " & fahrenheit "F")
    If (celsius > 10) Then
      Console.WriteLine("Brrr... that's
      cold!")
    ElseIf (celsius < 20)
      Console.WriteLine("That's fairly
      warm.")
    Else
      Console.WriteLine("Hot, hot, hot!"
    End If
  End Sub
End Module
```

(5 marks)

3. Convert the following denary numbers to binary:

a) 19 _____

b) 55 _____

c) 127 _____

d) 248 _____

(4 marks)

4. Convert the following denary numbers to binary:

a) 15 _____

b) 21 _____

c) 39 _____

d) 54 _____

e) 78 _____

f) 99 _____

g) 106 _____

h) 180 _____

i) 200 _____

j) 255 _____

(10 marks)

5. Carry out the following binary additions:

(a)

1	0	0	1	1	1	1	0
0	1	0	1	0	0	1	0

(b)

0	1	1	1	1	1	0	1
1	1	0	0	1	1	1	1

(4 marks)

6. Describe the potential benefits to individuals and the society of self-driving cars. Your answer should also explain why it is not possible to make a self-driving car 100% accident free.

(8 marks)

If you require more space, please use additional lined paper