

Name

HL	SL
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IBDP Computer Science

Year 11 Q1 Assessment

October, 2023

Instructions

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name and circle your level (HL/SL) at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Calculators must not be used in this paper.

The time available is the entire session.

If you complete the paper before the session ends, you may hand in your paper. After that, you have the option to read a book.

You may not use any technology during the entire session, even after handing in your paper.

There are 60 marks available in this paper.

APPENDIX A - String Class Methods

APPENDIX B - Java Cheat Sheet

1

Complete the truth table for an NOR gate.

A	B	O
0	0	
0	1	
1	0	
1	1	

[2]

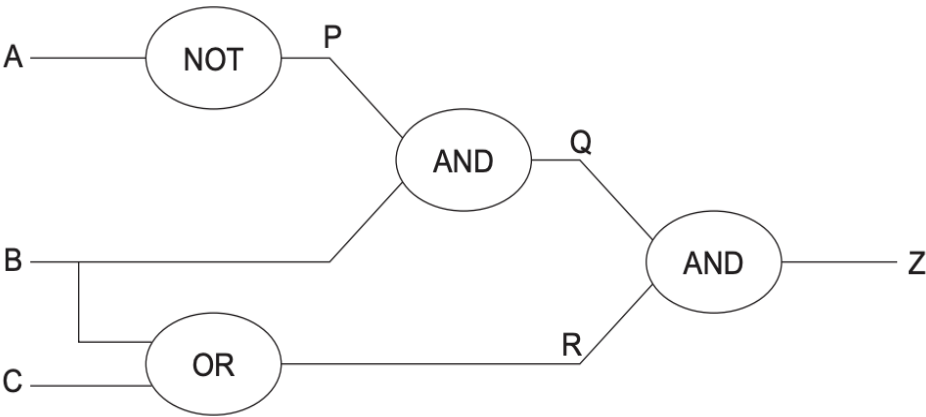
2

Complete the truth table for an XOR gate.

A	B	O
0	0	
0	1	
1	0	
1	1	

[2]

3



Complete the truth table for this logic circuit:

A	B	C	working area	Z
0	0	0		
1	1	1		

[4]

*to achieve full marks, the input sequence must be in the correct order.

4

Draw a logic circuit from the following logic statement:

output = 1 IF (A AND NOT B) OR (C)

[3]

5

Here is a nibble of binary information.
Convert it to decimal (denary).

1 1 1 1

working area

[1]

6

Here is a byte of binary information.
Convert it to hexadecimal.

0 1 1 0 1 0 1 1

working area

[2]

7

Here is a decimal number.
Convert it to a byte of binary information.

79

working area

[4]

8

Here is a decimal number.
Convert it to a hexadecimal number.

1 6 7

working area

[2]

9

The color used to represent the colour used in a pixel on a computer screen can be stored using 1 byte of information.

a) How many bits are in 1 byte of data?

[1]

b) How many possible colours can be represented by 1 byte of information?

[1]

c) Color codes are often expressed using hexadecimal, not binary. State one advantage of expressing a color code in hexadecimal.

[1]

d) Binary is known a base 2 number system. What base is hexadecimal referred to as?

[1]

e) List all of the characters used in the hexadecimal number system.

[1]

10

List three features that you may expect to find in the graphical user interface (gui) of a word processing application.

[3]

11

Draw the logic circuit for the following truth table:

A	B	Z
0	0	1
0	1	0
1	0	0
1	1	1

[2]

12

Explain the need for persistent storage.

[2]

13

Which of the following is an example of volatile primary memory?

- ☐ a RAM
- ☐ b ROM
- ☐ c SSD
- ☐ d None of the above

[1]

14

Which of the following is an example of persistent secondary memory?

- ☐ a RAM
- ☐ b CACHE
- ☐ c SSD
- ☐ d None of the above

[1]

15

Which of the following describe the purpose of an operating system?

- ☐ a Managing memory allocation
- ☐ b Managing file handling
- ☐ c Managing input and output devices
- ☐ d All of the above

[1]

16

Which one of the following will most likely have the largest capacity?

- ☐ a SSD
- ☐ b RAM
- ☐ c ROM
- ☐ d Cache

[1]

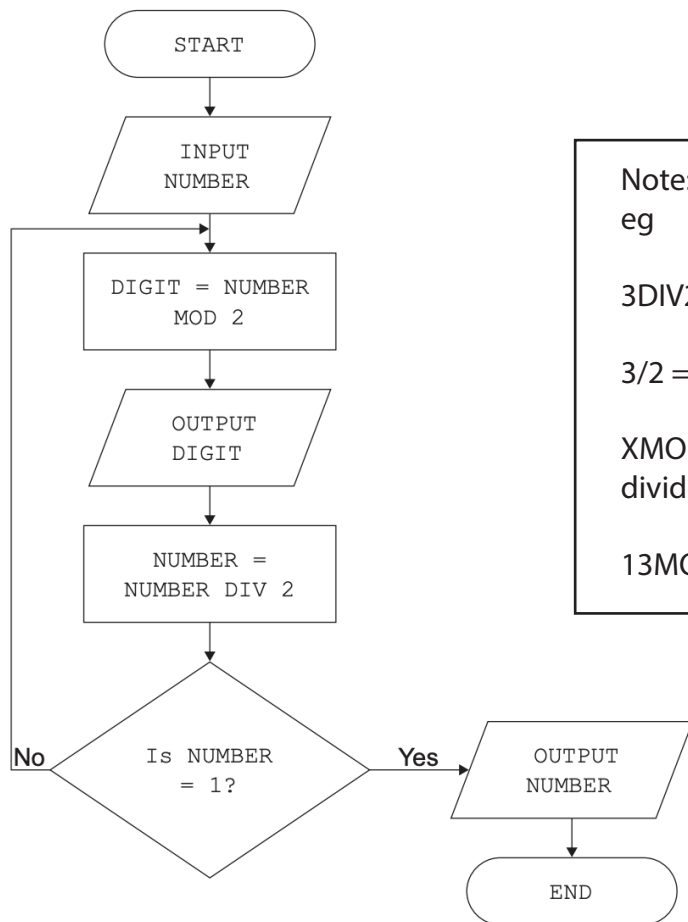
17

Volatile memory means

- ☐ a the contents of the memory are easily angered
- ☐ b the contents of the memory are lost if system power is lost
- ☐ c the contents of the memory are stored safely if power is lost
- ☐ d the contents of memory are placed temporarily in a virtual space

[1]

The following flowchart represents a standard algorithm.



Note: XDIVY relates to integer division eg
eg

$$3 \text{DIV} 2 = 1$$

$$3/2 = 1.5$$

XMODY produces the remainder of
dividing X by Y, eg

$$13 \text{MOD} 7 = 6$$

Copy and complete the table that traces the algorithm in the flowchart using an input value of 19.

NUMBER	DIGIT	OUTPUT
19		

19

State the purpose of the algorithm in Q19.

[2]

20

Distinguish between a variable and a constant.

[1]

21

The following shows a sequence using the hexadecimal number system:

9
A
B
C
D

Complete the sequence with the next 5 steps. Use the blank lines provided.

[1]

A computer program gets the age of a college applicant and determines if the application should be accepted or rejected.

Successful applicants are aged between 16 and 19 inclusive.

Questions 22 and 23 refer to this program.

```
1    static Scanner kbin;

2    public static void main(String[] args){

3        kbin = new Scanner(System.in);

4        int age = getAge();

5        while(age != -1){

6            if(age>=16 && age<=19){

7                String name = getName();

8                applicationAccept(name);

9            }else{

10                applicationReject(age);

11            }

12            age = getAge();

13        }

14    }

15    public static int getAge(){ //function header

16        int a;

17        System.out.println("Enter age or -1 to quit:");

18        a = kbin.nextInt();

19        return a;

20    }

21    public static String getName(){ //function header

22        String n;

23        System.out.println("Enter name: ");

24        n = kbin.nextLine();

25        return n;

    }
```

The `applicationAccept` function takes a `String` as a parameter.

If this parameter contains the word "smith" then

the function generates a random lottery number in the range 5-15. If the random lottery number is between 5 and 10 inclusive, then the function displays the message

"Lucky you!" Otherwise, if the lottery number is between

11 and 13 inclusive then the message "Close!" is displayed. Otherwise the message

"Unlucky!" will be displayed.

else the message "Your application will be processed next week" will be displayed.

Implement the `applicationAccept` function. Make sure you write the full function, including the full function header.

23

The `applicationReject` function takes an integer as a parameter.

It evaluates the parameter and displays a message telling the user if they are too young or too old to apply.

Example A: if the parameter is 13, the function will display a message "You are 3 years too young to apply."

Example B: if the parameter has a value of 23, the function will display a message "You are 4 years too old to apply".

Implement the `applicationReject` function. Include the full function header in your answer.

[3]

24

A function, `assessStrings` takes 2 Strings as parameters.

If the Strings are the same, it displays one of the Strings the same number of times as the length of the String. If the Strings are different, it display the shortest string the same number of times as the length of the shortest String.

For example, if one of the Strings is "Hello" and the other is "Rainy", it will display either of these Strings 5 times.

If one of the Strings is "Red" and the other is "Green", it will display "Red" 3 times.

Assume the two Strings are the same length only when they are the same Strings.

Implement the `assessStrings` function. Include the full function header in your answer.

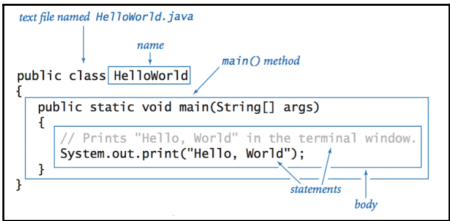
Appendix A - String class methods

`s1.length()` returns the length of a String eg
`String s1 = new String("Hello");`
`s1.length()` is 5

`s1.equals(s2)` returns true if s1 and s2 are the same, false otherwise
`String s1 = new String("Hello");`
`String s2 = new String("Goodbye");`
`s1.equals(s2)` returns false

`s1.contains(s2)` returns true if s1 contains s2, false otherwise
`String s1 = new String("Hello you!");`
`String s2 = new String(" yo");`
`s1.contains(s2)` returns true

Appendix B - Java Cheat Sheet



type	set of values	common operators	sample literal values
int	integers	+ - * / %	99 12 2147483647
double	floating-point numbers	+ - * /	3.14 2.5 6.022e23
boolean	boolean values	&& !	true false
char	characters		'A' '1' '%' '\n'
String	sequences of characters	+	"AB" "Hello" "2.5"

Printing.

void System.out.print(String s) print s
void System.out.println(String s) print s, followed by a newline
void System.out.println() print a newline

Nested if-else statement.

```
if (income < 0) rate = 0.00;
else if (income < 8925) rate = 0.10;
else if (income < 36250) rate = 0.15;
else if (income < 87850) rate = 0.23;
else if (income < 183250) rate = 0.28;
else if (income < 398350) rate = 0.33;
else if (income < 400000) rate = 0.35;
else rate = 0.396;
```

```
Scanner scan = new Scanner(System.in);

Double num1 = scan.nextDouble();

Int num2 = scan.nextInt();

String word = scan.nextLine();
```

Comparison operators.

op	meaning	true	false
==	equal	2 == 2	2 == 3
!=	not equal	3 != 2	2 != 2
<	less than	2 < 13	2 < 2
<=	less than or equal	2 <= 2	3 <= 2
>	greater than	13 > 2	2 > 13
>=	greater than or equal	3 >= 2	2 >= 3

```
int rand = (int) (Math.random()*100);
```

Booleans.

values	true or false		
literals	true	false	
operations	and	or	not
operators	&&		!

