Year 10 Interleaved homework 22

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1. Look at the array below and then answer the following questions

```
elements = ["Hydrogen", "Helium",
"Lithium","Beryllium",
"Boron", "Carbon", "Nitrogen"]
```

A. What data type is being stored in the array?

string

B. What would print(elements[len(elements)-3]) return?

☐ Lithium ☐ Beryllium ☒ Boron ☐ Carbon

C. To get multiple items from an array you can use the : inside the square brackets.

Eg: elements[0] will only get "Hydrogen", however elements[0:3] will get "Hydrogen", "Helium", "Lithium".

The data in the last index value is not included. This is why only the first three items are included and not Beryllium in position 3.

Write a single python instruction needed to output the values "Lithium","Beryllium","Boron"

print(elements[2:5])

D. Write the python code needed to change the value "Beryllium" to "Oxygen".

elements[3] = "Oxygen"

2. Read through the following python program, carefully

```
numberToConvert = "01110001"
total = 0
counter = 128
for i in numberToConvert:
    total = total + counter * int(i)
    counter = counter // 2

print(total)
```

A. What is the purpose of this program?

Convert the variable “numberToConvert” from binary to denary

B. What constructs are evident within the program?

☒ Sequence ☐ Selection ☒ Iteration

C. What is the output of the program?

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D. What is the purpose of line 6 counter = counter // 2?

Line 6 ensures the program uses the correct binary weight (power of 2) for each bit from left to right.

3. Explain why computers use Binary

Computers use binary because they operate using electrical signals that have two stable states (on and off) which are easily represented by 1 and 0.

4. Complete the following binary addition

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

5. Show how a binary number can be divided by 8 using a binary shift

Binary number: 1 0 1 1 0 0 1 1

00010110

6. Convert the decimal number 164 into binary. Show all your working out

10100100
164-128 = 36
36-32 = 4

7. Water Level Check Program

```
def waterHeight(maxLevel, minLevel, Level):
    if Level < minLevel:
        return "Too Low"
    elif Level > maxLevel:
        return "Overflow!"
    else:
        return "Within Range"
```

A. Name one parameter used by the subroutine.

maxLevel

B. State the data type of the return value.

string

C. What would be the output if the following code was ran:

```
height = waterHeight(60, 10, 50):
print(height)
```

☐ Overflow! ☐ Too Low Within Range

D. Write the code to call the subroutine with the following information:

- Level: 16
- Maximum Level: 90
- Minimum Level: 25

```
waterHeight(90, 25, 16)
```

8. Explain what is meant by the term Authentication.

In your answer you should give an example of one method of authentication.

Authentication → the process of verifying the identity of a user or device before granting access to a system or resource.

Example: entering a username and password to log into an account.

9. Explain the difference between a syntax error and a logic error.

In your answer you should give an example of each.

syntax error → an error within the formatting of the code, will cause the code to not work.

```
Print("hello world") # Errors because Print should have a lowercase P
```

logic error → an error within the expected outcome of the code, the code will still run

```
total = "12" + "14" # Expected to output 26 but doesn't because adding strings not integers/floats
```