Year 11 Computer Science - Programing

Python Programing Challenges Part 2

# Python Programming Practice

# Do Now Task

1. Log into the computers
2. Open and log into repl.it
3. Answer the exam style question below:

**Q1.**

A programmer has written a Python program that asks the user to input two integers and then output which of the two integers is the largest.

Complete the program below by filling in the gaps using the items in the box. You will not need to use all the items. Each item should only be used once.

|  |  |  |  |
| --- | --- | --- | --- |
| print | num1 | num2 | output |
| else | < | > | elif |
| str | float | int |  |

num1 = int(input("Enter a number: "))

num2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (input("Enter a second number: "))

if num1 > num2:

   print(" \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is bigger.")

elif num1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ num2:

   print(" \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is bigger.")

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

   print("The numbers are equal.")

**(Total 5 marks)**

**Q2.**

A cake recipe uses 100 grams of flour and 50 grams of sugar for every egg used in the recipe.

The code below shows the first line of an algorithm that will be used to calculate the amount of flour and sugar required based on the number of eggs being used. The number of eggs is entered by the user.

    eggsUsed ⟵ USERINPUT

(a)  Shade **one** lozenge to show which of the following lines of code correctly calculates the amount of flour needed in grams.

|  |  |  |
| --- | --- | --- |
| **A** | flourNeeded ⟵ USERINPUT |  |
| **B** | flourNeeded ⟵ eggsUsed \* USERINPUT |  |
| **C** | flourNeeded ⟵ eggsUsed \* 100 |  |
| **D** | flourNeeded ⟵ eggsUsed \* 50 |  |

**(1)**

(b)  Shade **one** lozenge to show which programming technique has been used in all of the lines of code in part (a).

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| --- | --- | --- |
| **A** | Assignment |  |
| **B** | Indefinite iteration |  |
| **C** | Nested iteration |  |
| **D** | Selection |  |

**(1)**

(c)  The developer wants to use validation to ensure that the user can only enter a positive number of eggs, ie one egg or more. The maximum number of eggs that can be used in the recipe is eight.

Develop an algorithm, using either pseudo-code or a flowchart, so that the number of eggs is validated to ensure the user is made to re-enter the number of eggs used until a valid number is entered.

You should assume that the user will always enter an integer.

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**(4)**

**(Total 6 marks)**

# Topic Goal

Today we will be doing the following:

* **Practice our exam style questions.**
* **Investigate Boolean logic use in IF statements.**
* **Review for loops.**
* **Practice using lists.**
* **Complete python programming challenges.**
* **Attempt the Exam board Programing Projects.**

# Programing warm up

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| **Warm up – Flower and Sugar Program** |
| A cake recipe uses 100 grams of flour and 50 grams of sugar for every egg used in the recipe.  The code below shows the first line of an algorithm that will be used to calculate the amount of flour and sugar required based on the number of eggs being used. The number of eggs is entered by the user.  Turn this exam question into a fully functioning script that displays the amount of flour and sugar the user needs when they enter the amount of eggs they will be using. Remember to include your validation rule from above!  **Save this as: CakeCalc** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
|  |

# Programing Challenges

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| **Challenge 1 – Mega Sale** |
| A local shop is having a promotion. If you spend over £10 you will get a £1 voucher to spend next time you come in the store. If you spend over £20 you get a £3 voucher.  Write a programme to tell the sales assistant which voucher to give the customer.  **Save this as: MegaSaleV1** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Challenge 2 – Happy Message** |
| Write a programme that gives users a message depending upon how happy they say they are.  You could get the user to rate how happy they feel on a scale between 1 and 10.   * If the reply is 3 or less it gives one message. * Between 4 and 7 (including these numbers) they get another message. * 8 and above they get a different message.   Try to make the messages ones to make them happy all day long!  **Save this as: PickMeUP** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Challenge 3 – Mobile Phone Costs (challenging)** |
| You want to see how much a mobile phone will cost. There are charges for sending pictures (£0.35), for texts (£0.10) and for data (£2.50 for 500MB). Data is sold in 500MB units which means if the uses 510MB that month they will be charged for 2 units of 500MB data.   1. Write a program that asks the user for how many pictures, texts and data they would use each month. It should then calculate a total bill for the month. 2. If the total comes to more than £10 they would be better on a contract. Get the programme to give them this advice.   **Hint:** You will need to use modulus division (%) and floor division (//) to solve the data calculation.  **Save this as: PhoneAdvice** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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# Boolean or logical expression

Boolean is a type of arithmetic that only uses two values: true or false, yes or no, 1 or 0.

It was invented by an English mathematician George Boole.

We use Boolean expressions and can combine them with **and**, **or** and **not** to make decisions in our programmes.

Complete the exam style question using a Boolean logical expression. By using an if statement with an AND in it which allows for two parts for the condition.

**Q1.**

Write a Python program that inputs a character and checks to see if it is lowercase or not.

Your program should work as follows:

•   gets the user to enter a character and store it in a suitable variable

•   determines if the entered character is a lowercase character

•   outputs LOWER if the user has entered a lowercase character

•   outputs NOT LOWER if the user has entered any other character.

You **should** use meaningful variable name(s), correct syntax and indentation in your answer.

The answer grid below contains vertical lines to help you indent your code accurately.

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**(Total 7 marks)**

# For Loops

Sometimes we want to do something a number of times.

We may know how many times we want to do it – and we use a **counting loop** OR

We may want to do it until something happens – and then we can use a **conditional loop.**

## Conditional Loops

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| **This is the simplest loop.**  **Try the following pieces of code within repl.it. Complete the table below.** | | |
| **Test code** | **Outcome** | **What does it do?** |
| for a in range (10):  print(a) |  |  |
| for a in range (1, 10):  print(a) |  |  |
| for a in range (1, 11):  print(a) |  |  |
| for a in range (1, 11,2):  print(a) |  |  |
| **Complete the labels below:** | | |
| for a in range (1, 11,2):  The 1 tells the loop:  The 11 tells the loop:  The 2 tells the loop: | | |

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| **Challenge 4 – For Loops Practice** |
| Write a loop that displays numbers 10 to 100 in steps of 5.  **Save this as: FiveCoutner** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Challenge 5 – Times Tables** |
| Write a script that functions in the following way.   * The user is asked for the times able they wish to see. * The number has a validation system ensuring it’s a whole number and will repeatedly ask for a whole number until the user enters one. * Then the user is asked how many iterations of that times table they wish to see. * The system will then display each iteration, the equation, and the result.   **Save this as: TimesTables** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Challenge 6 – Mega Sale** |
| A local shop is having a promotion. If you spend over £10 you will get a £1 voucher to spend next time you come in the store. If you spend over £20 you get a £3 voucher.  Write a programme to tell the sales assistant which voucher to give the customer.  It will function in the following way:   1. The script will loop until told to stop. 2. The script will store the item name and its cost. 3. The total costs will be calculated each time an items cost and name is added. 4. The voucher will be applied once the loop has been stopped. 5. Finally the following details will be displayed :  * All items and their costs. * The total cost before the voucher. * The total savings with the discount. * The total amount due with the discount applied.   **Save this as: MegaSaleV2** |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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# Python Projects

Below are two projects. These are like the challenges but a lot more complex and will require you to break down the program into chunks to solve.

These are projects set out by the exam board so spend your time solving them.

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| **Project 1 – Averages.** |
| Averages  Make a program that asks the user for a series of numbers until they either want to output the average or quit the program.  **Extensions:**  1. Expand the program to print the median and mode averages also  2. Include options so that if the user wants to, they can save their list of numbers to a text file and read them back out later on. |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Project 2 – Email Validator.** |
| Email validator Make a program to check whether an email address is valid or not.  For instance, you could make sure that there are no spaces, that there is an @ symbol and a dot somewhere after it.  Also check the length of the parts at the start, and that the end parts of the address are not blank.  **Extensions:**  1. When an email address is found to be invalid, tell the user exactly what they did wrong with their email address rather than just saying it is invalid  2. Allow the user to choose to give a text file with a list of email addresses and have it process them all automatically. |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Project 4 – Password reset program** |
| Only accept a new password if it is:  1. At least eight characters long  2. Has lower case and upper case letters.  The password reset program should also make the user input their new password twice so that the computer knows that the user has not made any mistakes when typing their new password.  **Extensions:**  1. Make some sort of algorithm to suggest how strong the password is (Weak, Medium, Strong) depending on length, whether or not the password has special characters in etc  2. Let the user input their username. The program should go to a text file with a list of usernames and old passwords, and the program should only let you change your password if you input your old password |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
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| **Project 5 – Basic Lists** |
| Make a program that lets a user input a series of names into a list.  The program should then ask the user whether they want to print out the list in the original order, or in reverse.  **Extensions:**  1. Enable the user to choose what number item in the list they want to print out  2. Enable the user to only print out a ‘slice’ of the list (eg item three to item nine only)  3. Enable the user to remove any items of the list that they want to  4. Enable the user to save their list to a file for later, and also enable them to load it back up again too  5. ‘Clean’ the list by making all the items lowercase. |
| **Write your functioning code below:**  (This is an important step as your exam is a written exam as you need to practice this skill) |
|  |