



A level Computer Science Transition work

- Specification link:
<https://www.ocr.org.uk/qualifications/as-and-a-level/computer-science-h046-h446-from-2015/>
- Write pseudocode for all programs in the given space.

Submitted By :

Double Number

Write a function called `double` that asks the user to input a number. The function should double the number and print the result. The function should keep asking for a number until the number doubled is larger than 20.

OCR Theme Park

OCR Land is a theme park aimed at children and adults.

One ride in OCR Land has a minimum height of 140 cm to ride alone or 120 cm to ride with an adult.

Create an algorithm that:

- asks the user to input the height of the rider, in centimetres
- if needed, asks if they are riding with an adult
- outputs whether or not they are allowed to ride
- repeats this process until 8 people have been allowed to ride

Prices for tickets to OCR land are as follows.

Adults £35

Children - £28

If there are 4 or more children, there is a discount of £35 per order.

Write a procedure called family that will take the number of adults and children as two inputs from the main program and output the correct price based on the conditions above.

At OCR Cinemas, entrance tickets are sold online. An adult ticket to OCR Cinema costs £15.99, with a child ticket costing £8.99. A booking fee of £2.50 is added to all orders.

A function, `ticketprice()`, takes the number of adult tickets and the number of child tickets as parameters from the main program. It calculates and returns the total price to be paid. Use a high level programming language to create an algorithm for the function `ticketprice()`. The algorithm should call the function `ticketprice()` into the main program and output the following message "Your total ticket price is "

A delivery company charges 80p per mile for deliveries. If the order is over £20, they add on an additional 10%. Write a function called `delivery` that will take the number of miles and order price as parameters and work out the delivery charge. The delivery charge should be returned to the main program. In the main program, the delivery charge should be output to the screen with a suitable message.

)A school kitchen computer system uses a function called newbalance() to calculate a student's

new account balance when they pay for a meal.

For example, if a student with an account balance of 9.50 has a meal costing 2.20 the newbalance()function should return the new balance of 7.30. If the balance is less than 0, it should return "Not enough funds".

(i) Write an algorithm for this function which:

- takes the student's account balance as a parameter
- takes the cost of the meal as a parameter
- returns the new account balance / message

OCR Airlines keeps track of customers' luggage using a printed tracking code on each item of luggage. Each tracking code is made up of 8 characters and begins with the letter P or Q.

(a) Write an algorithm that:

- Allows a tracking code to be entered
- Decides if the tracking code is valid or not.
- Outputs "VALID" if the code follows the above rules and "INVALID" if it does not.

Useful Information

A distance of *five* miles is the same as *eight* kilometres. To convert from kilometres to miles you therefore need to divide by eight and multiply by five. For example, ten kilometres would be $10 \div 8 \times 5 = 6.25$ miles.

You don't need to round the answer, but after testing your program you might want to. There's a command called *round()* in Python that rounds the number you give it. You can give it only the number and it'll round to the nearest whole number, e.g. *round(1.73)* gives 2. Alternatively you can give it the number to round and a number of decimal places, e.g. *round(1.73,1)* would give 1.7.

Your Task

Your task is to produce a program to convert. Your program should ask the user for the number of kilometres that they want to convert store the number of kilometres as a number calculate the equivalent number of miles output the answer

Factorial

Find the factorial of a positive integer. For example, "5 factorial" or $5!$ is found creating the product of $5 \times 4 \times 3 \times 2 \times 1 = 120$. The factorial of 0 (zero) is defined as being 1.

Create a program that will ask the user for a factorial and produce the correct output.

Prices for tickets to OCR land are as follows.

Adults £35

Children £28

If there are 4 or more children, a discount of £30 is given to each group. Write a function that will pass the number of adults and children to a procedure called total and output the correct total price.

Tom is writing a program to calculate the wages of workers in a factory.

The wages earned by a worker is either £1.88 for every product they have made or £11.70 for every hour they have worked, whichever is larger.

Write an algorithm that:

- Create a function called pay takes the number of products name and the hours worked from the main program
- The function should calculate the pay from the number of products made
- The function should then calculate the pay from the hours worked
- Return the largest value to the main program.
- Output the total pay in the main program

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Prices for tickets to OCR land are as follows.

Adults £35

Children - £28

If there are 2 adults and 2 children then the price is charged at the family rate of £99. Write a function that will pass the number of adults and children to a procedure called total and output the correct total price. (Do not worry about other combinations of adults and children – they will be charged a standard price|)

7. Using pseudocode, write an algorithm that will use a count-controlled loop to print out the numbers 1 to 10 in ascending order.

Taxi Challenge

A taxi firm charges £3 for the first mile of a journey and £2.20 for each mile after that. If there are 5 or more passengers, an extra 50% is added to the price. Write a function that takes the number of passengers and miles travelled as parameters and returns the total cost of a journey.

The car dealership sells electric cars, which require charging before they can be driven. Charging the battery by 1% takes 10 minutes. For example, a battery has 80% charge. It would take 200 minutes, or 3 hours and 20 minutes to charge to 100%. Write an algorithm that:

asks the user for the current battery charge percentage

outputs "full" for a battery currently at 100%

calculates how long this battery would take to charge

outputs this in hours and minutes

1(a). An estate agent uses a computer system to record details of the houses that it has for sale. Each house has a type, location, bedrooms and price. When details are entered into the system they are validated to check that they are sensible. Prices can range between 1 and 10000000. Bedrooms can range between 1 and 50.

- Write a function called `validate()` that will take the price and bedrooms as parameters and check that sensible values have been entered for both inputs
- Return “Accepted” if the data is valid and “Not accepted” if the data is invalid.

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1b) Write an algorithm that will ask the user to enter bedrooms and price and call the function returning the correct value back into the main program. (3)

A teacher researches the length of time students spend revising each day.

The teacher writes a program to add up and print out the total number of minutes student 2 revised over 5 days (Monday to Friday).

```
total = total + minsRevised[2,0]
total = total + minsRevised [2,1]
total = total + minsRevised [2,2]
total = total + minsRevised [2,3]
total = total + minsRevised [2,4]
print(total)
```

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Refine the program to be more efficient. Write the refined version of the algorithm.

Screen 7 in OCR cinemas contains a bar area that can only be accessed by adults (18 or over) or children accompanied by adults.

Create an algorithm that:

- **asks the user to input the age of the ticket holder**
- if needed, asks if they are with an adult
- outputs whether or not they are allowed to enter Screen 7
- repeats this process until 8 people have been asked to input their age

A memory game is played where:

three players (A, B and C) have to choose a number between 0 and 100

if the number has already been chosen, a message is displayed that says "taken"

if the number has not already been chosen, the player's letter is placed next to it

The winner is the player who has chosen the most unique numbers by the end of the game.

The numbers are stored in an array called numbers.. A number that has not yet been chosen is stored as an empty string "". The players are represented by strings "A", "B" and "C".

0	1	2	3	4	5	...	99	100
		A		B				A

You have been asked to program part of the game.

Write an algorithm for player A's turn, which;

- takes as an input the number that player A chooses
- if it has not already been chosen, stores an "A" in that array element
- if it has already been chosen, outputs "taken"

OCR Theme Park

OCR Land is a theme park aimed at children and adults. Entrance tickets are sold online. An adult ticket to OCR Land costs £19.99, with a child ticket costing £8.99. A booking fee of £2.50 is added to all orders.

Create an function called `totalPrice ()` that takes the number of adult and child tickets as parameters, calculates and returns the total order price to the main program.

A library gives each book a code made from the first three letters of the book title in upper case, followed by the last two digits of the year the book was published.

For example, "Poetry from the War", published in 2012 would be given the code POE12.

- i. Complete the following pseudocode for a function definition that will take in the book title and year as parameters and return the book code.

```
01 function librarycode (title, .....)  
02     parta = title.subString (0, .....)  
03     partb = year.subString (2, 2)  
04     ..... parta.upper + partb  
05 endfunction
```

•Use pseudocode to write an algorithm that does the following :

- Inputs the title and year of a book from the user.
- Uses the librarycode function above to work out the book code.
- Permanently stores the new book code to the text file bookcodes.txt

5. OCR town are holding an election with three candidates (A, B and C). An electronic voting booth will be used to allow people to vote.

Write an algorithm that:

- **Allows voters to enter either A, B or C.**
- Keeps track of how many times each candidate has been voted for.
- As soon as one person has finished voting, allows the next person to vote.
At any point allows the official to type in "END", which will print out the number of votes for each candidate and the total number of votes overall.
- The scores should then be sent to a text file called results.txt

Temperature

Write an algorithm that will allow a user to input the hourly temperatures in one day in Centigrade. The algorithm should print out in Fahrenheit the average Temperature

Fixzz Buzz

Create a program that replicates the famous game Fizz Buzz.

The program will take an input, e.g. 20, and then print out the list of Fizz Buzz up to and including that number, where:

Any multiple of 3 is replaced by the word 'Fizz'

Any multiple of 5 is replaced by the word 'Buzz'

Any multiple of both 3 and 5 is replaced by the word 'FizzBuzz'

Temperature

Write an algorithm that will allow a user to input the hourly temperatures in one day in Centigrade. The algorithm should print out in Fahrenheit the

Maximum temperature

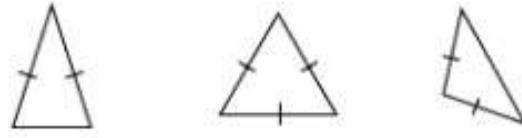
Minimum temperature

Average Temperature

Average of 10 Numbers

Write an algorithm that allows the user to input 10 numbers and outputs the largest and also the average of the numbers entered. This information should also be saved into a text file called numbers.

An isosceles triangle is a triangle that has at least two equal sides. The diagram below shows examples of isosceles triangles. In each diagram the marked sides are equal.



Write an algorithm for a computer program that determines whether a triangle is an isosceles triangle.

- The user inputs the lengths of the three sides as Length1, Length2 and Length3
- If any two sides have the same length the program outputs "Isosceles"
- Otherwise the program outputs "Not Isosceles"

The following names of students are stored in an array with the identifier `studentnames`.

```
studentnames = ["Rob", "Anna", "Huw", "Emma", "Patrice", "Iqbal"]
```

A school uses the array to call an attendance register every morning.

Write an algorithm using iteration to:

- display the name of each student one at a time from `studentnames`
- take as input whether that student is present or absent
- display the total number of present students and number of absent students in a suitable message, after all student names have been displayed.

Shadow Questions

A library gives each book a code made from the first three letters of the book title in upper case, followed by the last two digits of the year the book was published.

For example, "Poetry from the War", published in 2012 would be given the code POE12.

a) Complete the following pseudocode for a function definition that will take in the book title and year as parameters and return the book code.

```
01 def librarycode (title, .....)  
02     parta = title (0,___)  
03     partb = year(____, 2)  
04     _____ parta + partb
```

b) Use pseudocode to write an algorithm that does the following :

- Asks the user to input the title and year of a book
- Calls the librarycode function above to work out the book code
- Stores the new book code to the text file bookcodes.txt

A theatre offers a discount to customers of 25% off tickets if they are over 65 or work for the NHS. The offer is not valid on Friday's.

Write a function called `discount ()` that will

Asks the user to input their age, If they work for NHS and day of the week.

Pass correct inputs from the main program into the function as parameters

Decide if they are entitled to a discount

Return a suitable message into the main program to say if they are entitled to a discount.

A theatre offers a discount to customers of 25% off tickets if they are over 65 or work for the NHS. The offer is not valid on Friday's. Tickets without a discount cost £38.

Design an algorithm that will

- Allow the user to input required data including how many tickets they are purchasing.
- Decide if they are entitled to a discount
- Output the total price of their tickets including any discount if they are entitled to it.

A teacher has written a program that will allow them to input data from test scores and output the average score. A piece of the code is below. Re-write the code to make it more efficient.

```
s1 = int (input("Please enter a score"))
s2 = int (input("Please enter a score"))
s3 = int (input("Please enter a score"))
s4 = int (input("Please enter a score"))
total = s1+s2+s3+s4
average = total / 4
print (average)
```

A teacher has written a program that will allow them to input data from test scores and output the average score. A piece of the code is below. The teacher wants to make the code more efficient and adapt the program so that it allows the user to choose how many scores to input each time the program runs. Write an algorithm that

- Asks the user how many scores they would like to input
- Asks the user to input a score until the quantity of scores the user input have been entered
- Calculate and output the average of these numbers
- Calculate and output the lowest number

```
s1 = int (input("enter score"))
```

```
s2 = int (input("enter score"))
```

```
s3 = int (input("enter score"))
```

```
total = s1+s2+s3
```

```
print(total /3)
```

A teacher has written a program that will allow them to input data from test scores and output the average score. A piece of the code is below. The teacher wants to make the code more efficient and adapt the program so that it allows the user to choose how many scores to input each time the program runs. Write an algorithm that

Asks the user how many scores they would like to input

Asks the user to input a score until the quantity of scores the user input have been entered

Calculate and output the the average of these numbers

Calculate and output the lowest number

```
s1 = int (input("Please enter a score"))
```

```
s2 = int (input("Please enter a score"))
```

```
s3 = int (input("Please enter a score"))
```

```
s4 = int (input("Please enter a score"))
```

```
total = s1+s2+s3+s4
```

```
average = total / 4
```

```
print (average)
```

A cinema uses an online booking system for customers to book tickets. When tickets are purchased online, the customer is asked to input different pieces of data. The data is checked as it is inputted that it meets specific requirements.

“First name” and “Surname” can't be empty

Ticket number cant be 0 or greater than 5.

If any of the data above is invalid then a message is displayed saying “Check your data and try again”.

If the data is valid then a message is displayed saying “Proceed to payment”.

Complete the program below which will validate the inputs.

```
Firstname = input("Enter first name")
```

```
Surname= input("Enter surname")
```

```
NumofTickets= int(input("How many tickets would you like to purchase(1 – 5)"))
```

A restaurant charges a service charge of 10% for tables with less than 7 customers and 15% for tables with 7 or more customers. Create a function called ServiceCharge that will take the total amount of the meal and the number of customers and return the total price for customers to pay. E.g. a table of 5 customers with a meal price of £100 will have to pay £110 in total.

Your algorithm should

- Ask the user to input the table size and cost of meal in the main program
- Pass the inputs to a function called ServiceCharge
- Calculate the total cost of a meal
- Return the correct total price to the main program

Lists

Write a program that asks the user for some text and then counts the number of vowels in it.

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```
1 text = input("enter text: ")
2 vowelCount = 0
3
4 for i in range(len(text)):
5     if text[i] == "a":
6         vowelCount+=1
7     if text[i] == "e":
8         vowelCount+=1
9     if text[i] == "i":
10        vowelCount+=1
11    if text[i] == "o":
12        vowelCount+=1
13    if text[i] == "u":
14        vowelCount+=1
15    else:
16        vowelCount+=0
17
18 print(f"Number of vowels equals {vowelCount}")
```


Date

Write a program that asks the user for a date as three separate inputs - you can specify the format. Check that the date: is in the specified format and that that the date is valid