

## Write programs in C++ to solve the following problems:

### Instructions:

1. You should recall these problems from Grok, you now have the chance to re-write them in C++. If a question is too difficult, move the next question.
2. Save each program using notepad as a text file. Do not use MS Word to save your programs, it will format the text which can break your program.
3. If you have completed all 10 questions, create a flow chart for each algorithm. You can use <http://draw.io> instead of MS Word

### Question 1

Write a program that reads in a number (integer) as input, adds 1 to it, and then prints out the result. Here is an example interaction between your program and the user:

```
Please enter a number: 3
4
```

### Question 2

In your travels through space time you come across a robot with the useful (?) ability to repeat everything you say, as many times as you want. Write a program to control this robot.

Your program should work like this:

```
What do you want me to say? spam
How many times do you want me to say it? 5
spamspamspamspamspam
```

### Question 3

Ali Baba is trying to open a cave door to find the treasure. His brother overhears thieves saying the password, but he can't quite work out what it is.

Write a program to ask Ali for a password. If the password is correct, the cave door will be opened. Otherwise nothing will happen.

Your program should work like this when Ali says "Open sesame!":

```
What is the password Ali? Open sesame!
The cave door opens!
```

If Ali says anything else the program should do nothing:

```
What is the password Ali? Open the door
```

## Question 4

You are trying to log in to your old computer, and can't remember the password. You sit for hours making random guesses... I'm sure you thought it was funny back when you came up with that password (chEEzburg3rz).

Write a program that tells you whether your guess is correct. If it is correct, it should grant access like this:

```
Enter password: chEEzburg3rz
Access granted
```

If your guess is incorrect it should deny access like this:

```
Enter password: lolcatZ
Access denied
```

Remember the correct capitalization is important for passwords!

## Question 5

Write a program that works out whether your bank balance is **in the red**. If the number of dollars is zero or positive it should work like this:

```
Number: 50
In the black :)
```

But when your balance goes negative, your program should work like this:

```
Number: -1
In the red :(
```

## Question 6

Write a program to tell you which method of transport to use for your next outing.

The first step in this decision is based on the weather. If it is currently raining, you should take the bus.

If it is not currently raining, your method of transport should be determined by the distance you need to travel. If the distance is greater than 10km, you should take the bus. If it is between 2km and 10km (inclusive), you should ride your bike, and if it less than 2km, you should walk. The distance should always be a whole number.

Your program should only ask for the distance if it is relevant to the answer. That is, if it is raining, it shouldn't ask you how far you need to travel.

```
Is it currently raining? Yes
You should take the bus.
```

```
Is it currently raining? No
How far in km do you need to travel? 8
You should ride your bike.
```

```
Is it currently raining? No
How far in km do you need to travel? 1
You should walk.
```

The answers provided will always be **Yes**, **No** or a whole number for distances.

### Question 7

One of the first things we teach kindergarten children is to count to ten, but since computers are so good at maths, we can train ours to count to  $n$  instead.

Write a program that asks for a number,  $n$ , and then prints out all the numbers between 1 and  $n$ . Your program should work like this:

```
Enter a number: 7
1
2
3
4
5
6
7
```

### Question 8

Write a program that reads in a whole number and prints out that number divided by two. Your program should work like this:

```
Number: 4
Half number: 2.0
```

Or like this:

```
Number: 5
Half number: 2.5
```

### Question 9

In July 2011, the final [NASA Space Shuttle mission](#) launched from the Kennedy Space Center.

Write a program to run the countdown sequence for the shuttle launch. Your program should work like this:

```
Time to launch: 10
Counting down ...
10 ...
9 ...
8 ...
7 ...
6 ...
5 ...
4 ...
3 ...
2 ...
1 ...
Lift Off!
```

## Question 10

In an attempt to fit in with the other kids, our Artificial Intelligence unit, Alice, likes to play guessing games. Her favourite game is *Guess my favourite food*.

Write a program to play this game with Alice. An interaction with your program should look like this:

```
What is my favourite food?
Guess? chips
Not even close.
Guess? broccoli
Not even close.
Guess? electricity
You guessed it! Buzzzz
```

Sadly Alice isn't very creative, and so her answer is always electricity. Of course she never gets tired, and is happy to play this for hundreds of iterations until the other kids get it right (or pull the plug).