**Task C: This is a difficult task** that requires you to learn about nested loops and the “stack” for storing and recovering register data before making an attempt. It is worth approximately 20% of this assessment (5% of final unit mark). **It is worth attempting this part with a view to picking up extra marks even if you cannot complete the task.**

In the past one of the classic way of benchmarking a computer system (i.e determining how fast/good it is), was to get the computer to undertake large numbers of calculations and time how long it took. This was done by embedding a simple calculation in the heart of a nested loop and then increasing the number of loops within the nest

Using the MIPS architecture and assembly language create a fully commented programme that allows a user to input ANY three digit number and then uses that number if as many nested do, as possible to calculate the following:

(Three digit number) divided by 7 = result

The “result” must NOT increment after each loop. i.e you simply repeat the same calculation time after time

Make sure that what every computer you are working on takes 30 seconds to complete all loops and calculations. This is done by progressively increasing the size of the three digit number.

At the end of the programme output ONCE the result of:

Three digit / 7 = result

Where “/” indicates “divided by”.

If you input 999 (the largest three digit number possible) and the MIPs programme takes less than a second to run then add another nested loop. Continue to add loops until the time the programme takes to run can be altered between 5 and 30 seconds simply by adjusting the three-digit number inputted in by the user. i.e the number 999 should result in a run time of 30 seconds.

The number of nested loops required will depend on your coding efficiency and the computer system that you are working on.

Finally – it is possible to use the system time to monitor the start and end time of the loop. Implement this additional code and output to screen the exact time taken for every calculation. This is extremely hard to do!

|  |
| --- |
| **In your report**  Write a further 300 words describing how the programme works (or why it doesn’t – you will get marks for a critical reflection) and include a screen shot of both the input stage and the final output and Indicate the number of nested loops you need for your computer system to complete this task  Include a system description screenshot, which includes processor speed and system type. E.g for a Windows based computer:    Draw a flow diagram illustrating the logic behind your programme code.  Copy and paste your code into a word document. |