



## Computer Science 3B

### Practical Assignment E1

Assignment date:

2024-10-14

Deadline

2024-10-18 17h05

Marks: 100

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This practical assignment must be uploaded to [eve.uj.ac.za](https://eve.uj.ac.za) **before** 2024-10-18 17h05. Late<sup>1</sup> or incorrect submissions **will not be accepted**, and will therefore not be marked. You are **not allowed to collaborate** with any other student. Plagiarism is not tolerated. All submissions are tested for plagiarism.

Good coding practices include a proper coding convention and a good use of commenting. Marks will be deducted if these are not present.

The reminder page includes details for submission. Please ensure that **ALL** submissions follow the guidelines. The reminder page can be found on the last page of this practical.

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The aliquot sum  $s(n)$  of a positive integer  $n$  is the sum of all proper divisors of  $n$ , that is, all divisors of  $n$  other than  $n$  itself. A proper divisor is a divisor that is a whole number that is less than the number being used. Proper divisors can be expressed with the following notation:  $d|n$ , example: proper divisors of 8:=  $d|8 = 1, 2, 4$

The aliquot sum is defined as follows:

$$s(n) = \sum_{d|n} d$$

Example:  $d|8 = 1, 2, 4$  and  $s(8) = 1 + 2 + 4 = 7$

Write an 80x86 assembly DLL. **No design is required!** The DLL will contain the following functions:

```
1 // Calculate  $s(n) = \sum_{d|n} d$ 
2 int aliquotSum(int n);
3
4 // Classify n based on  $s(n)$ 
5 int classify(int n);
```

The **classify** will return the following values:

$$\text{classify}(n) = \begin{cases} -1, & \text{if } s(n) < n \\ 0, & \text{if } s(n) = n \\ 1, & \text{if } s(n) > n \end{cases}$$

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<sup>1</sup>Alternate arrangements for exceptional circumstances will be posted on eve.

## Important

The following has been provided under additional files for this practical:

- DLL template code
- Executable that will use your DLL (use this executable to test your program)

## Mark sheet

Marks are based on how well does each function in your DLL works based solely on output.

- |                               |      |
|-------------------------------|------|
| 1. <i>aliquotSum</i> function | [50] |
| 2. <i>classify</i> function   | [50] |
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## NB

Submissions which **do not assemble** will be capped at 40%!

Practical marks are awarded subject to the student's ability to explain the concepts and decisions made in preparing the practical assignment solution.

(Inability to explain code → inability to be given marks.)

Execution marks are awarded for a correctly functioning application and not for related code.

# Reminder

Your submission must follow the naming convention below:

SURNAME\_INITIALS\_STUDENTNUMBER\_SUBJECTCODE\_YEAR\_PRACTICALNUMBER

**Example:** Berners-Lee\_TJ\_209912345\_CSC03B3\_2024\_PE1

<b>Surname</b>	Berners-Lee	<b>Module Code</b>	CSC03B3
<b>Initials</b>	TJ	<b>Current Year</b>	2024
<b>Student number</b>	209912345	<b>Practical number</b>	PE1

Your submission must be **a single zip (compressed) file!**

Your submission must include the following folders:

File	Naming	Folder	Purpose
Source	PE1.dll	src	Contains your DLL file created for this assignment.
Source	PE1DLL.asm	src	Contains all relevant source code. Your details must be included at the top of the source code <sup>0</sup> .

## Multiple uploads

Note that only **one** submission is marked. If you already have submitted once and want to upload a newer version then submit a newer file with the same name as the uploaded file in order to overwrite it.

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<sup>0</sup>Failure to correctly indicate your details will result in a penalty.