Computer Science 3B

Practical Assignment 04

Assignment date:	2024-08-15
Deadline	2024-08-15 17h05
Marks: 75	

This practical assignment must be uploaded to eve.uj.ac.za **before** 2024-08-15 17h05. Late[1] 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 assignment.

BeatWatch wants to refine some of their calorie calculations. They have come up with the following formulae:

$$\mathbf{HRF}_i = \frac{(\mathbf{HR}_i - \text{RHR}) \times \text{CMul}}{(220 - \text{age}) - \text{RHR}}$$

Inputs

age:	age in years	[single]
HR:	heart rate during activity	[**array**]
RHR:	resting heart rate	[single]
CMul:	calorie heart rate multiplier	[single]

Outputs

HRF:	heart rate factor	[**array**]

Write an **80x86** assembly program that will ask the user for the inputs as specified above. Display the final **HRF** array. Note that the **HR** and **HRF** arrays will be of length 3.

Your program must continually ask the user if they want to process another set of data. You are only allowed to create global variables for **HR** and **HRF** arrays, as well as any string prompts. All other user inputs must be stored in *local variables*.

Bonus

Submit the bonus project as a separate zipfile with the practical number as `P04_B`. Failure to do so will result in issues with marking the normal practical and lead to a loss of marks!

Create the required arrays as local variables instead of global variables.

[1] Alternate arrangements for exceptional circumstances will been posted on eve.

Testing set - Use these values to test your program:

Age	RHR	CMul	HR	HRF
20	69	52	[167,142, 78]	[38, 28, 3]
24	73	58	[83,165,139]	[4, 43, 31]
26	66	56	[102, 99,186]	[15, 14, 52]
29	60	56	[137, 62,112]	[32, 0, 22]
39	72	54	[116,111,126]	[21, 19, 26]
47	78	57	[109,121, 98]	[18, 25, 12]
48	71	54	[93,117, 87]	[11, 24, 8]
52	71	56	[88, 72,142]	[9, 0, 40]
54	61	53	[115, 68, 77]	[27, 3, 8]

Mark sheet

1. Design **[05]**
2. Exit loop **[05]**
3. Store input into stack **[10]**
4. Calculate **HRF** **[10]**
5. Display **HRF** **[05]**
6. Structure and layout (no temporary variables, correct data types) **[05]**
7. Commenting **[05]**
8. Correct execution **[30]**
9. Local arrays **[20 (bonus)]**

Total **[75]**

NB

Submissions that **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_P04`

Surname	Berners-Lee	**Module Code**	CSC03B3
Initials	TJ	**Current Year**	2024
Student number	209912345	**Practical number**	P04

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

Your submission must include the following:

File	**Naming**	**Folder**	**Purpose**
`Design`	`STUDENTNUMBER_P04.pdf`	`docs`	Contains your program design. All files must be in **PDF** format. Your details must be included at the top of any **PDF** files submitted[0].
`Source`	`STUDENTNUMBER_P04.asm`	`src`	Contains all relevant source code. Your details must be included at the top of the source code[0].

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.

[0] Failure to correctly indicate your details will result in a penalty.