

C Coursework

CS-M64 / CS-M74

Due: 9th May 2011

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This coursework involves writing a couple of simple programs that illustrate various aspects of C programming. The programs that must be written for this coursework are:

1. Hello, <name>!

Write a program that asks the user to type their name and age, and then prints a welcome message including their name. The user's name and age should be stored in a struct * that you've dynamically allocated with malloc, calloc or realloc.

[10 marks]

The program should also print the number of vowels (a, e, i, o, u) contained in the user's name.

[10 marks]

The program should convert the first character of each word entered by the user to uppercase if it's not already. (Hint: see the ctype.h library)

[5 marks]

The program should also print whether the person's age is odd or even.

[5 marks]

As an example, entering:

dave

27

into the program will result in the output:

Hello, Dave!

2 vowels in your name.

Your age (27) is odd.

This should be submitted as a single file called hello.c

2. Fibonacci Generator/Factorial Calculator

Write a program that asks the user for a single number n , and then prints the first n Fibonacci numbers.

The Fibonacci sequence is defined as beginning with 0 and 1, and then subsequent values are the sum of the previous two, i.e.:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

[10 marks]

The program should also calculate and output the factorial of the number entered. The factorial of a number n is defined as the product of all positive integers less than or equal to n .

For example, the factorial of 5 is calculated as: $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$

[10 marks]

The program should indicate whether the number entered was a prime number.

[5 marks]

As an example, entering the value

4

into the program should produce the following output:

First 4 fibonacci numbers: 0, 1, 1, 2

4 factorial: 24

4 is not prime

This program should be submitted as 5 files:

- `fibfac.c` - The `main()` function and supporting functions
- `fibonacci.h` - Function prototypes for Fibonacci calculation functions
- `fibonacci.c` - Function implementations for Fibonacci calculation
- `factorial.h` - Function prototypes for factorial calculation functions
- `factorial.c` - Function implementations for factorial calculation

Extra Info

An additional 10 marks will be awarded for code readability of both programs (i.e, indenting, commenting, consistent bracket/brace usage, etc.)

All code will be compiled and tested on machines in the Linux lab - so ensure your code works there!

Submission of Work

The work you produce will comprise the 6 files listed above. These should be put into a `.zip` or `.tar.gz` file and submitted at the following web URL:

<https://cs.swansea.ac.uk/~csdavea/teaching/submission/>

The deadline for this work is 23:59 on 9th May 2011. Following the standard University guidelines on late submission of work, the marks awarded will be reduced by 10% for each day the work is late, and will be reduced to zero if submission is over a week late.

If you have any problems or questions regarding this coursework, please get in touch any time - my email address is D.Arter@swansea.ac.uk