

## COS 135 Individual Assignment 5

Due: Monday 02/27/23 End of the day

*This assignment has 4 programs to be developed.*

What to submit:

- .c source codes for each task.
- Your programs must produce similar outputs as given if the same inputs are provided.

**[10 pts] Comments** are required in the following locations (in each C source code):

- At the top of the source code comment your name and a short program description.
- Comment the purpose of each variable.
- Comment major sections of code such as input, processing, and output.

Program Design: Your program is a professional document and must be neat and easy to read. All programs should follow these specifications.

- Comments should be aligned and entered in a consistent fashion
- Blank lines should be added to aid readability
- Code within blocks should be indented
- Comments should not contain spelling mistakes
- Variables names should be meaningful

**Write C programs for following tasks and submit your source codes (you must submit .c files without compilation warnings or errors).**

**Sample Program inputs are highlighted in yellow.**

(a) **[10 pts]**

On the NASA Space Shuttle, three computers were in use simultaneously. Computations were performed by all three computers, and the result of each computation was put to a vote. If at least two of the computers provided the same result, that result was then used. But if all three computers each provided a different result, then the computation was discarded.

Write a program which prompts for three different numbers, as a simulation of three different computational results. If at least two of the inputs are the same, your program should output that value. If all three inputs are different, output the word "ERROR" instead.

<u>Sample output #1:</u>	<u>Sample output #2:</u>
<pre>Enter first number: 5 Enter second number: 8 Enter third number: 5  Value: 5</pre>	<pre>Enter first number: 5 Enter second number: 8 Enter third number: 9  Value: ERROR</pre>

Example program execution:

```
nimesha@cos135:/media/cos135/5$ sudo gcc hw5a.c -o hw5a
nimesha@cos135:/media/cos135/5$ ./hw5a
Enter the first number: 5
Enter the second number: 5
Enter the third number: 9
Value: 5
nimesha@cos135:/media/cos135/5$ ./hw5a
Enter the first number: 2
Enter the second number: 6
Enter the third number: 10
Value: ERROR
nimesha@cos135:/media/cos135/5$
```

(b) **[20 pts]**

Write a C program to request information from a user (via keyboard input) and outputs a summary statement.

In your C program, a user enters the following information of a new job applicant.

**Program inputs:**

New applicant's name:

New applicant's birth year:

New applicant's preferred monthly salary (USD):

Two examples (program outputs and interactive user inputs) are stated below:

**Sample output # 1:**

New applicant's name: Britney William

Enter applicant's birth year: 1982

Enter monthly salary (USD): 5000

**Sample output #2:**

New applicant's name: Curtly Ambrose

Enter applicant's birth year: 1976

Enter monthly salary (USD): 5500

**Program outputs:**

*After obtaining the above information, the program should output following summary statements respectively:*

**Example 1 output:**

Britney William is a 40 years old applicant and requests a monthly salary of \$5000.00

**Example 2 output:**

Curtly Ambrose is a 46 years old applicant and requests a monthly salary of \$5500.00

### Example program execution:

```
nimesha@cos135:/media/cos135/5$ sudo gcc hw5b.c -o hw5b
nimesha@cos135:/media/cos135/5$ ./hw5b
New applicant's name: Tom Cruise
Enter applicant's birth year: 1972
Enter monthly salary (USD): 12000
Tom Cruise is a 51 year-old applicant, who requests a monthly salary of $12000.00.
nimesha@cos135:/media/cos135/5$ ./hw5b
New applicant's name: Ian Botham
Enter applicant's birth year: 1955
Enter monthly salary (USD): 18800
Ian Botham is a 68 year-old applicant, who requests a monthly salary of $18800.00.
nimesha@cos135:/media/cos135/5$
```

### (c) [20 pts]

Write a C program to continuously check whether an alphabet (lowercase or uppercase) entered by the user is a vowel or a consonant. Enter # to exit the program.

*First your program has to verify the character entered by the user is part of the English alphabet (can be lowercase or uppercase). If yes, check it for a vowel or a constant.*

<u>Sample output # 1:</u>	<u>Sample output # 2:</u>	<u>Sample output # 3:</u>
Enter a letter: a a is a vowel	Enter a letter: N N is a consonant.	Enter a letter: \$ '\$' is not a valid character

### Example program execution:

```
nimesha@cos135:/media/cos135/5$ sudo gcc hw5c.c -o hw5c
nimesha@cos135:/media/cos135/5$ ./hw5c
Enter a letter: Q
'Q' is a consonant
Enter a letter: E
'E' is a vowel
Enter a letter: i
'i' is a vowel
Enter a letter: a
'a' is a vowel
Enter a letter: @
'@' is not a valid character
Enter a letter: 2
'2' is not a valid character
Enter a letter: #
Good bye!
nimesha@cos135:/media/cos135/5$
```

(d) [40 pts]

Ellen loves to eat candies. She went to a nearby candy store that sells only chocolates and toffees to buy **N** bags of chocolates and **M** bags of toffees. The price of a bag of chocolate is \$15.50, and a bag of toffee is \$6.90.

The candy store currently has a promotion:

1. if *anyone buys more than 5 bags of chocolates will be given a 10% discount*
2. if *anyone buys more than 2 bags of toffees will be given a 5% discount.*
3. after the above discounts, if *a customer's grand total is more than \$100, they will be given an additional 10% discount.*

You are hired to develop the software for this candy store's new Point-of-sale (POS) device using C programming language.

Write a program to input the number of chocolate and toffee bags, then to display an itemized receipt.

**Example #1:**

Enter customer name: Ellen  
Enter number of chocolate bags: 14  
Enter number of toffee bags: 8

**Program output #1:**

```
                Hello Ellen
Chocolates      x14      $ 217.00
    after discount      $ 195.30

Toffees         x8       $ 55.20
    after discount      $ 52.44

Total after discount      $ 247.74
    after 10% discount    $ 222.96

                You owe      $ 222.96
                Thank you!
```

**Example #2:**

Enter customer name: Mary  
Enter number of chocolate bags: 5  
Enter number of toffee bags: 2

**Program output #2:**

```
                Hello Mary
Chocolates      x5       $ 77.50
    after discount      $ 77.50

Toffees         x2       $ 13.80
    after discount      $ 13.80

Total after discount      $ 91.30
    after 10% discount    $ 91.30

                You owe      $ 91.30
                Thank you!
```

### Example program execution:

```
nimesha@cos135:/media/cos135/5$ sudo gcc hw5d.c -o hw5d
nimesha@cos135:/media/cos135/5$ ./hw5d
Enter customer name: Amaa
Enter number of chocolate bags: 89
Enter number of toffee bags: 92

      Hello Amaa
Chocolates      x89      $ 1379.50
  after discount      $ 1241.55

Toffees         x92      $ 634.80
  after discount      $ 603.06

      Total          $ 1844.61
  after 10% discount      $ 1660.15

      You owe        $ 1660.15
      Thank you!
nimesha@cos135:/media/cos135/5$
```

```
nimesha@cos135:/media/cos135/5$ ./hw5d
Enter customer name: Ivy
Enter number of chocolate bags: 2
Enter number of toffee bags: 4

      Hello Ivy
Chocolates      x2      $ 31.00
  after discount      $ 31.00

Toffees         x4      $ 27.60
  after discount      $ 26.22

      Total          $ 57.22
  after 10% discount      $ 57.22

      You owe        $ 57.22
      Thank you!
nimesha@cos135:/media/cos135/5$
```