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| ***Computer Engineering Department*** |
| ***CE100L: Computing Fundamentals & Programming*** |

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| ***Course Instructor: Usama Bin Shakeel*** | ***Dated: 11/10/2021*** |
| ***Lab Engineer: Nadir Abbas*** | ***Semester: Fall 2021*** |
| ***Teaching Assistant: Aqsa Khalid*** | ***Batch: BSCE2021*** |

# **Lab 3A. If-else statements & Functions**

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| **Name** | **Roll number** | **Report**  **(out of 100)** | **Scaled to 10** | **Total**  **(out of 10)** |
| NIMRA MAQBOOL | BSCE21012 |  |  |  |

Checked on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## **Objective**

The goal of this lab is to make students familiar with the Number System used in computer operations through a practical hand on exercise.

## **Equipment and Component**

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| --- | --- | --- |
| **Component Description** | **Value** | **Quantity** |
| Computer | Available in lab | 1 |

## **Conduct of Lab**

1. Students are required to perform this experiment individually.
2. In case the lab experiment is not understood, the students are advised to seek help from the course instructor, lab engineers, assigned teaching assistants (TA) and lab attendants.

## **Theory and Background**

If-else statements are used whenever the actions are dependent on some preconditions. Functions are used to perform certain actions, and they are important for reusing code; define the code once, and use it many times. Information can be passed to functions as a parameter. Parameters act as variables inside the function. Parameters are specified after the function name, inside the parentheses. You can add as many parameters as you want, just separate them with a comma.

**Lab Tasks**

### Task A

Write a function 'baseToPowerExponent' that takes two parameters; base and exponent. It calculates the power of base according to the value of exponent and returns the answer. (Suppose that exponent cannot be greater than 5). In case of invalid input, return -1.

e.g if base is 2 and exponent is 3, then answer should be 8.

**Code:**

int baseToPowerExponent(int base, int exp){

int result = 0;

// Write your code here

Using namespace std;

int baseToPowerExponent(int base, int exp){

int result = 0;

if (exp ==0)

{

result=1;

}

else if (exp==1)

{

result=base;

}

else if (exp==2)

{

result=base\*base;

}

else if (exp==3)

{

result=base\*base\*base;

}

{

else if (exp==4)

}

else if (exp==5)

{

result=base\*base\*base\*base\*base;

}

result=base^exp;

else if (exp>5)

{

result=-1;

}

else

cout<< "invalid output";

return result; // returns the variable that stored the answer

}

### Task B

Use 'decimalToBinary' conversion code done in the previous lab (2B). Combine the individual bits into a single binary number.

int decimalToBinary(int n) {

int bin = 0;

// Write your code here

// Hint: Use string concatenation OR calculate the binary value using mathematical operations. Either way you need to make sure you return an integer.

Int decimal to binary (int n)

{

int b1,b2,b3,b4;

int bin;

{

b1=num%2;

num=num/2;

b2=num%2;

num=num/2;

b3=num%2;

num=num/2;

b4=num%2;

num=num/2;

bin=(b4\*1000)+(b3\*100)+(b2\*10)+(b1\*1);

}

return bin; // returns the variable that stored binary value

}

#### **Assessment Rubric for Lab**

**Method for assessment:**

Lab reports and instructor observation during lab sessions. Outcome assessed:

a. Ability to conduct experiments, as well as to analyze and interpret data (P) b. Ability to function on multi-disciplinary teams (A)

c. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (P)

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| Performance metric | Mapping (task no. and description) | | Max marks | Exceeds expectation | Meets expectation | Does not meet expectation | Obtained marks |
| 1. Realization of experiment (a) | 1 | Functionality | 40 | Executes without errors excellent user prompts, good use of symbols, spacing in output. Through testing has been completed (35-40) | Executes without errors, user prompts are understandable, minimum use of symbols or spacing in output. Some testing has been completed (20-34) | Does not execute due to syntax errors, runtime errors, user prompts are misleading or non-existent. No testing has been completed (0-19) |  |
| 2. Teamwork (b) | 1 | Group Performance | 5 | Actively engages and cooperates with other group member(s) in effective manner (4-5) | Cooperates with other group member(s) in a reasonable manner but conduct can be improved (2-3) | Distracts or discourages other group members from conducting the experiment (0-1) |  |
| 3. Conducting experiment (a, c) | 1 | On Spot Changes | 10 | Able to make changes (8-10) | Partially able to make changes (5-7) | Unable to make changes (0-4) |  |
| 2 | Viva | 10 | Answered all questions (8-10) | Few incorrect answers (5-7) | Unable to answer all questions (0-4) |  |
| 4. Laboratory safety and disciplinary rules (a) | 1 | Code commenting | 5 | Observes lab safety rules; handles the equipment and parts with care and adheres to the lab disciplinary guidelines aptly (4-5) | Generally observes safety rules and disciplinary guidelines with minor lapses (2-3) | Disregards lab safety and disciplinary rules (0-1) |  |
| 5. Data collection (c) | 1 | Code Structure | 5 | Excellent use of white space, creatively organized work, excellent use of variables and constants, correct identifiers for constants, No line-wrap (4-5) | Includes name, and assignment, white space makes the program fairly easy to read. Title, organized work, good use of variables (2-3) | Poor use of white space (indentation, blank lines) making code hard to read, disorganized and messy (0-1) |  |
| 6. Data analysis (a, c) | 1 | Algorithm | 20 | Solution is efficient, easy to understand, and maintain (15-20) | A logical solution that is easy to follow but it is not the most efficient (6-14) | A difficult and inefficient solution (0-5) |  |
| 7. Computer use (c) | 1 | Documentation | 5 | Timely documented (4-5) | Late documented (2-3) | Not documented (0-1) |  |
|  | Max Marks (total): | | 100 | Obtained Marks (total): | | |  |

Lab Engineer Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_