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| https://upload.wikimedia.org/wikipedia/commons/thumb/4/4e/VU_Logo.png/260px-VU_Logo.png | **Introduction to Computing (CS101)**Assignment # 01 | **Total marks = 20** **1st June, 2020** |
| **Please carefully read the following instructions before attempting assignment.****RULES FOR MARKING****It should be clear that your assignment would not get any credit if:*** **The assignment is submitted after the due date.**
* **The submitted assignment does not open or file is corrupt.**
* **Strict action will be taken if submitted solution is copied from any other student or from the internet.**

**You should consult the recommended books to clarify your concepts as handouts are not sufficient.****You are supposed to submit your assignment in .doc or docx** **format.** Any other formats like scan images, PDF, zip, rar, ppt and bmp etc will not be accepted. **Objectives:*** **To understand the practical implementation of 2’s complement number.**
* **To understand the basic concept of Boolean logical operations and how to use it to solve a problem.**
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| **NOTE****No assignment will be accepted *after the due date via email in any case* (whether it is the case of load shedding or internet malfunctioning etc.). Hence refrain from uploading assignment in the last hour of deadline. It is recommended to upload solution file at least two days before its closing date.****If you find any mistake or confusion in assignment (Question statement), please consult with your instructor before the deadline. After the deadline no queries will be entertained in this regard.****For any query, feel free to email at:****cs101@vu.edu.pk** |

**Questions No 01** **Marks (10)**

You are required to perform the following stated operations in Binary Number System

* (320)10 + (-122)10
	+ Please first convert the stated Decimal Numbers into Binary Numbers.
	+ Perform the Arithmetic operation on Binary Numbers.
	+ Convert the calculated answer back into Decimal Number System.

**Note:** You are bound to show each, and every step involved in conversions or arithmetic operations involved.

Solution:

**Step – 1:**

Conversion of (320)10 into binary:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 = 256 | 27 = 128 | 26 = 64 | 25 = 32 | 24 = 16 | 23 = 8 | 22 = 4 | 21 = 2 | 20 = 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

Conversion of (122)10 into binary:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 = 256 | 27 = 128 | 26 = 64 | 25 = 32 | 24 = 16 | 23 = 8 | 22 = 4 | 21 = 2 | 20 = 1 |
| 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |

**Step – 2:**

2’s complement for of (001111010)2 = (110000110)2

(101000000)2

 + (110000110)2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(011000110)2

**Step – 3:**

Convert back to Decimal Number:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 = 256 | 27 = 128 | 26 = 64 | 25 = 32 | 24 = 16 | 23 = 8 | 22 = 4 | 21 = 2 | 20 = 1 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |

= 128+64+4+2

= (198)10

**Questions No 02** **Marks (10)**

For the following Boolean Expression, you are required to fill the stated table below:

$$(\~(A⨁B)∧D)∨C)$$

**Symbol to operator mapping:**

($⨁$ = XOR)

(~ = NOT)

(∨ = OR)

(∧ = AND)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$A$$ | **B** | **C** | **D** | $$(A⨁B)$$ | $$\~(A⨁B)$$ | $$(\~(A⨁B)∧D)$$ | $$(\~(A⨁B)∧D)∨C)$$ |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |