CS150 - Computer Organization and Architecture
Homework #1 - Spring 2023

1. Convert the following binary numbers to equivalent decimal numbers.

- *(a)* $(00001101)_2$
- *(b)* $(00010001)_2$
- *(c)* $(01101101)_2$
- *(d)* $(11011101)_2$
- *(e)* $(11111111)_2$
- *(f)* $(11100.011)_2$

2. Convert the following decimal numbers to equivalent binary numbers.

- *(a)* $(67)_{10}$
- *(b)* $(54)_{10}$
- *(c)* $(255)_{10}$
- *(d)* $(256)_{10}$
- *(e)* $(2416)_{10}$
- *(f)* $(4096)_{10}$

3. Convert the following octal numbers to equivalent decimal numbers.

- *(a)* $(35)_8$
- *(b)* $(2347)_8$

4. Convert the following decimal numbers to equivalent octal numbers.

- *(a)* $(91)_{10}$
- *(b)* $(132)_{10}$
- *(c)* $(521)_{10}$

5. Convert the following hexadecimal numbers to equivalent decimal numbers.

- *(a)* $(C4)_{16}$
- *(b)* $(3FF)_{16}$
- *(c)* $(BEEF)_{16}$

6. Convert the following decimal numbers to equivalent hexadecimal numbers.

- *(a)* $(30)_{10}$
- *(b)* $(312)_{10}$
- *(c)* $(513)_{10}$

7. Convert the following binary numbers to equivalent octal numbers.

- *(a)* $(11101)_2$
- *(b)* $(11101101)_2$
- *(c)* $(10110101)_2$

8. Convert the following binary numbers to equivalent hexadecimal numbers.

- *(a)* $(101010)_2$
- *(b)* $(111100110)_2$
- *(c)* $(11010101)_2$

9. Miscellaneous - Perform the following base conversions.

- *(a)* $(341)_5 = (?)_{10}$
- *(b)* $(76)_{10} = (?)_7$
- *(c)* $(1101001)_2 = (?)_4$
- *(d)* $(BFE)_{16} = (?)_{12}$
- *(e)* $(2112)_3 = (?)_8$
- *(f)* $(7AD)_{16} = (?)_{10}$
- *(g)* $(6101)_7 = (?)_{10}$

10. Perform the following **binary** arithmetic.

```
a.  01010111
  + 00110011
    --------
```

```
b.  00100110
  + 01001111
    --------
```

```
c.  01010011
  + 10111011
    --------
```

```
d.  01011100
  + 00011111
    --------
```

```
e.  10011011
  - 00111011
    --------
```

```
f.  01011001
  - 00011111
    --------
```

11. Perform the following **octal** arithmetic.

```
a.  424
  + 163
    ---
```

```
b.  5112
  + 1346
    ----
```

12. Perform the following **hexadecimal** arithmetic.

```
a.  A4
  + 27
    --
```

```
b.  7F3
  + 41D
    ---
```

```
c.  806
  -  4B
    ---
```

```
d.  56C
  - 2FF
    ---
```