# Problem Set 1
## COMP301 Spring 2023
**Week 1: 27.02.2023 - 03.02.2023**

**Instructions:**

- Submit your answers to the Blackboard PS1 assignment until March 4th Saturday, at 23.59.
- Please submit only **one single PDF file**, where all of your codes for each of the parts are included.
- Name your submission file as *id_username_ps1.pdf*
  (Example: *00000_nnayal17_ps1.pdf*).

**Problem 1:** In this problem, you will practice the elements of programming. Given the code block below, please find the results printed on the interpreter in response to each expression:

```
(+ 25 9 16)
(/ 24 4)
(+ (* 3 28) (- 2 2))
(define a 8)
(define b (+ a 7))
(+ a b (* a b))
(= a b)
(if (and (> b a) (< b (* a b)))
   b
   a)
(cond ((= a 9) 6)
    ((= b 3) (+ 6 7 a))
    (else 25))
(+ 10 (if (> b a) b a))
(* (cond ((> a b) a)
      ((< a b) b)
      (else -1))
  (+ a 15))
```

**Problem 2:** In this section, you will focus on procedures and recursion.

**Part A.** Given a list, implement a procedure named "idx_getter" that takes the given list and an integer $n$, and returns the $n'th$ element in that list (if the list is empty, then return an empty list). Check the *car* and *cdr* operations to see how to take subsets of the given list. What would we change if we would want to retrieve the sub-list of the given list between $i^{th}$ and $j^{th}$ index? You can test your implementation with the following code piece:

```
(idx_getter '(1 2 3 4 5 6) 0) ; returns 1
(idx_getter '(1 1 2 3 5 8 13 21) 4) ; returns 5
(idx_getter '() 0) ; returns '()
```

**Part B.** Implement a procedure, that takes a positive number $n$ and returns the $n'th$ number of the sequence defined below. If $n$ is given negative, then the procedure returns 0.

$$a_0 = 1$$
$$a_n = a_{n-1}^2 + 4$$

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**Part C.** Given a positive integer $n$, implement a procedure that returns $\#t$ if the number $n$ is a prime number, otherwise it returns $\#f$. If $n$ is given negative, then the procedure returns $\#f$.