

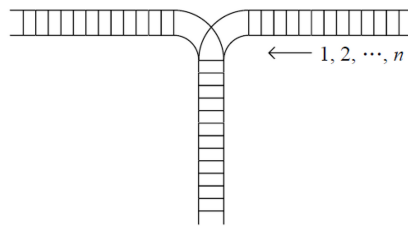
Data Structures (2026 Fall)

Assignment 02

Chuang-Chieh Lin

Department of Computer Science and Engineering,
National Taiwan Ocean University

1. Rewrite the `eval` function of postfix expressions so that it evaluates the unary operators `+` and `-` (You can assume `get_token` is ready to use; tokens in the input are separated by space).
2. Consider the railroad switching network. Railroad cars numbered $1, 2, \dots, n$ are the right. Each car is brought into the stack of limited capacity 3 and can be popped out at any time. For instance, if , we could move in 1, move in 2, move in 3, and then take the cars out, producing the new order 3, 2, 1. For $n = 4$, find out the IMPOSSIBLE permutations of the cars. Submit your answers as well as either your explanations or the C code.



3. Prove that the value of `count` in the function below is $\Theta(n \log n)$.

```
double coupon_count (int n) {  
    double count = 0;  
    for (int i=0; i<n; i++) {  
        count += n/(n-i);  
    }  
    return count;  
}
```

4. Compute the postfix and prefix form of the following infix expressions (assuming unary negation as `~`).
 - (a) `a * b * c`
 - (b) `-a + b - c + d`
 - (c) `(a + b) * d + e / (f + a * d) + c`
5. Evaluate the following expressions.
 - (a) `+ / + 2 4 3 / * 4 + / 6 2 1 8` (prefix form).
 - (b) `4 2 - 5 * 6 3 / +` (postfix form)
 - (c) `- + * 2 7 / 24 - 8 2 * 3 + 1 2` (prefix form)