

EECS2011 Fundamentals of Data Structures
(Winter 2022)

Q&A - Syllabus

Monday, January 10

Jan 31st

↳ in-person

Assignments / Proctests

↳ Graded by Unit tests.

≈ 50%

① 40% starter
papers

② extra tests.

③ 50 → 35

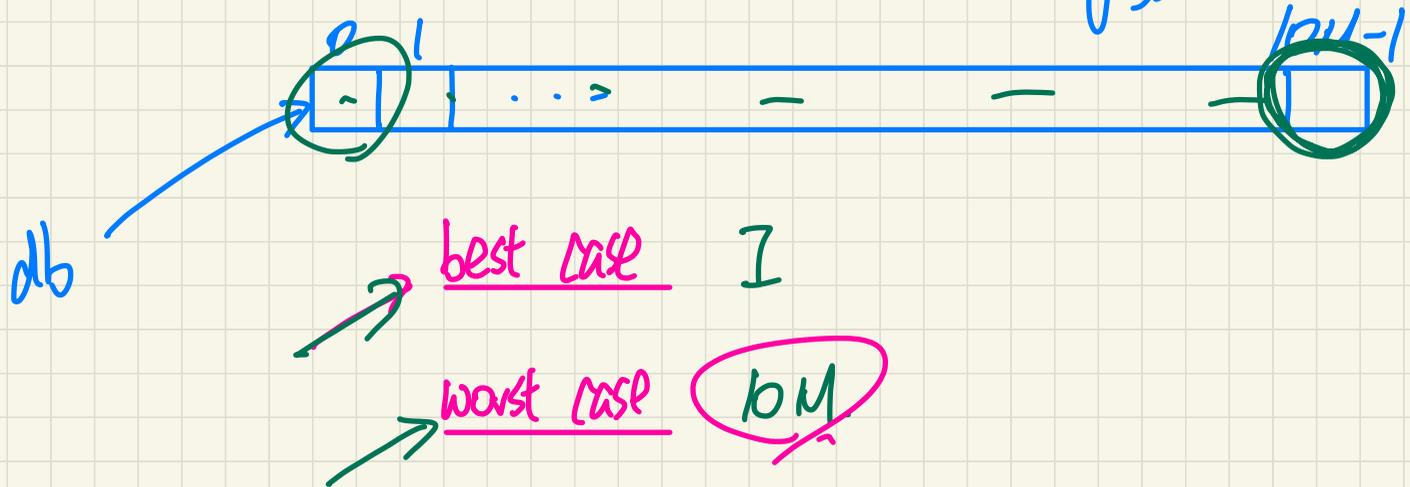
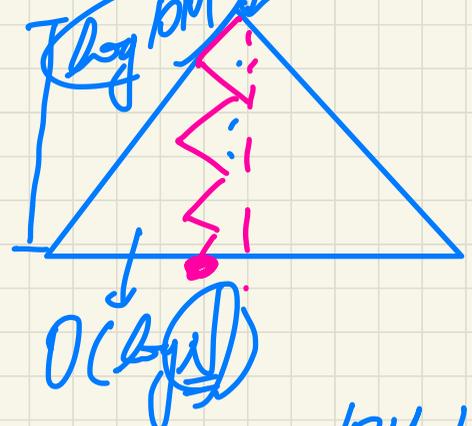
70%

A Searching Problem

```
ResidentRecord find(int sin) {  
    for(int i = 0; i < database.length; i++) {  
        if(database[i].sin == sin) {  
            return database[i];  
        }  
    }  
}
```

iterations.

balanced BST (23) 10M.



Program Optimization Problem

EELS430Z
Compilers & Interpreters.

```
b := ... ; c := ... ; a := ...  
across i |...| n is i  
  loop  
    read d  
    a := a * 2 * b * c * d  
  end
```

```
b := ... ; c := ... ; a := ...  
temp := 2 * b * c  
across i |...| n is i  
  loop  
    read d  
    a := a * d * temp  
  end
```

optimized

parsed

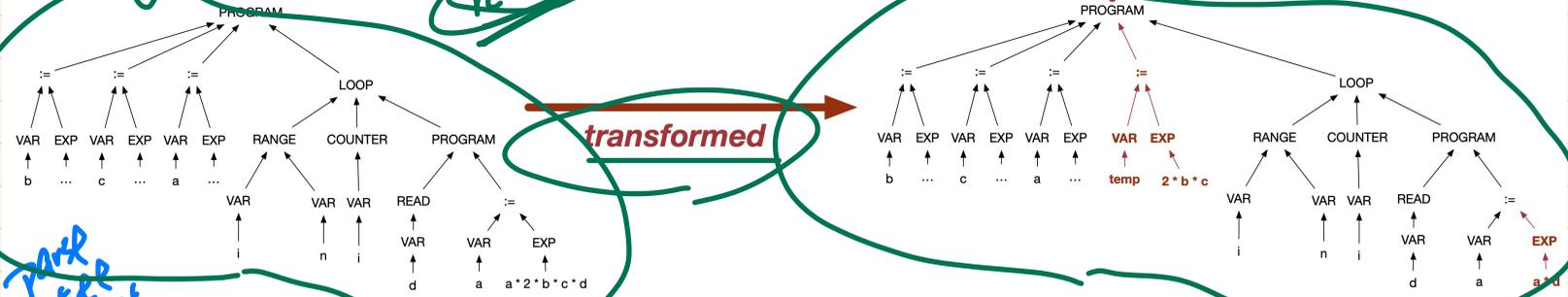
EELS200d
→ CFG:

VRANSON

pretty-printed

transformed

Parse tree
(abstract syntax tree)



Program Translation Problem

```
class Account {  
  attributes  
    owner: Traveller . account  
    balance: int  
}
```

```
class Traveller {  
  attributes  
    name: string  
    reglist: set(Hotel . registered)[*]  
}
```

```
class Hotel {  
  attributes  
    name: string  
    registered: set(Traveller . reglist)[*]  
  methods  
    register {  
      t? : extent(Traveller)  
      & t? /: registered  
      ==>  
        registered := registered \ {t?}  
        || t?.reglist := t?.reglist \ {this}  
    }  
}
```

translated

```
CREATE TABLE 'Account'(  
  'oid' INTEGER AUTO_INCREMENT, 'balance' INTEGER,  
  PRIMARY KEY ('oid'));  
CREATE TABLE 'Traveller'(  
  'oid' INTEGER AUTO_INCREMENT, 'name' CHAR(30),  
  PRIMARY KEY ('oid'));  
CREATE TABLE 'Hotel'(  
  'oid' INTEGER AUTO_INCREMENT, 'name' CHAR(30),  
  PRIMARY KEY ('oid'));  
CREATE TABLE 'Account_owner_Traveller_account'(  
  'oid' INTEGER AUTO_INCREMENT, 'owner' INTEGER, 'account' INTEGER,  
  PRIMARY KEY ('oid'));  
CREATE TABLE 'Traveller_reglist_Hotel_registered'(  
  'oid' INTEGER AUTO_INCREMENT, 'reglist' INTEGER, 'registered' INTEGER,  
  PRIMARY KEY ('oid'));
```

parsed

Abstract Syntax Tree of
Source Object-Oriented Program

transformed

Abstract Syntax Tree of
Target Relational DB Queries

pretty-printed