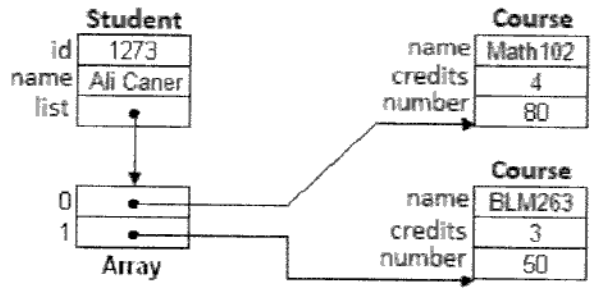
**BLM 305** Midterm Exam Nov 5, 2018

(Duration: 80 minutes. No exchange of materials)

| | |
|---|---|
| 1 | 25 |
| 2 | 20 |
| 3 | 15 |
| 4 | 25 |
| 5 | 15 |

1. Consider the simplified object diagram shown below (used also in Question 4)




a) Fill in the blanks to define the two classes below

```
class Student {
   constructor( id, name     ){
      this.id = id
      this.name = name
      this.list = []
   }
   addCourse(c) {
      this.list.push(c)
   }
}
class Course {
   constructor( name, c, n    ){
      this.name = name
      this.credits = c
      this.number = n
   }
}
```

b) Write down three statements that generate the object diagram above
(Use the constructors and the `addCourse()` method)

```
p = new Student(1273, "Ali Caner")
p.addCourse(new Course("Math102", 4, 80))
p.addCourse(new Course("BLM263", 3, 50))
```

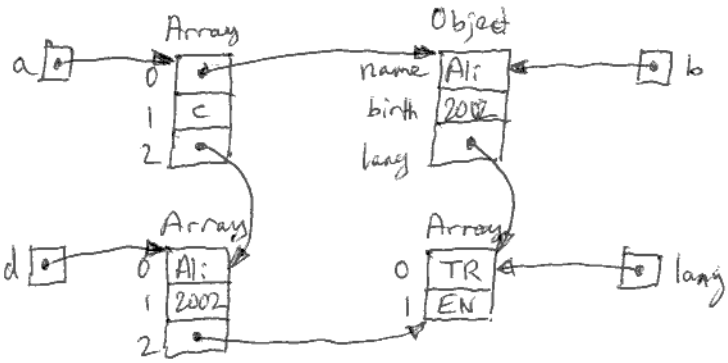
c) Define `toString()` method for `Student` class with this output:

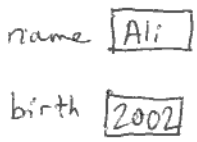
```
"Ali Caner, 1273 - with 2 courses"
```

```
toString() {
   return this.name + ", " + this.id + " - with "
          + this.list.length + " courses"
}
```

2. Draw a simplified object diagram after running the program piece below:

```
let name = "Ali", birth = 2002, lang = ["TR", "EN"],
    b = {name, birth, lang}, d = [name, birth, lang],
    a = [b, "c", d];
```




3. Write a function that calculates the intersection of two given Sets a and b
(Return a Set that contains elements common in a and b. Do not modify a or b.)

```
function intersection(a, b) {
    let s = new Set()
    for (let x of a)
        if (b.has(x)) s.add(x)
    return s
}
```

4. Array `data` contains a large number of `Student` objects as defined in Question 1

a) Make a Set of Courses found in `data`

```
let s = new Set()
for (let std of data)
   for (let c of std.list)
      s.add(c)
```

b) Make a Map `m` which stores the Student object for each Student id

`m.get(1273)` should return the object for "Ali Caner, 1273"

```
let m = new Map()
for (let std of data)
    m.set(std.id, std)
```

c) Define a class that stores the passport number for foreign students

```
class Foreign extends Student {
   constructor( id, name, pass     ){
      super (id, name)
      this.pass = pass
   }
}
```

d) Write down all the properties of p and q defined below (name and value)

```
let P = new Student(1273, "Ali Caner")
```

id ↑ name ↑ list = []

```
let q = new Foreign(9340, "Tim Lee", "A3456X")
```

id ↑ name ↑ pass ↑ list = []

5. Write a function that draws a triangular pattern of size n, as shown below (for n=5)

```
*
**
***
****
*****
```

```
function triangle(n) {  let s= ''
   for (let i=0; i<n; i++) {
      s += '*'
      console.log(s)
   }
}
```