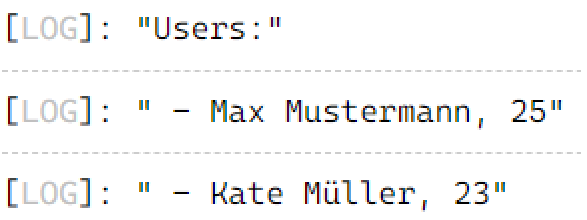
Задание 1

Замена *type* на *interface*, объявление типа данных *users: User[]* и *user: User*

```
export interface User {
    name: string;
    age: number;
    occupation: string;
};

export const users: User[] = [
    {
        name: 'Max Mustermann',
        age: 25,
        occupation: 'Chimney sweep'
    },
    {
        name: 'Kate Müller',
        age: 23,
        occupation: 'Astronaut'
    }
];

export function logPerson(user: User) {
    console.log(` - ${user.name}, ${user.age}`);
}

console.log('Users:');
users.forEach(logPerson);
```

Результат:

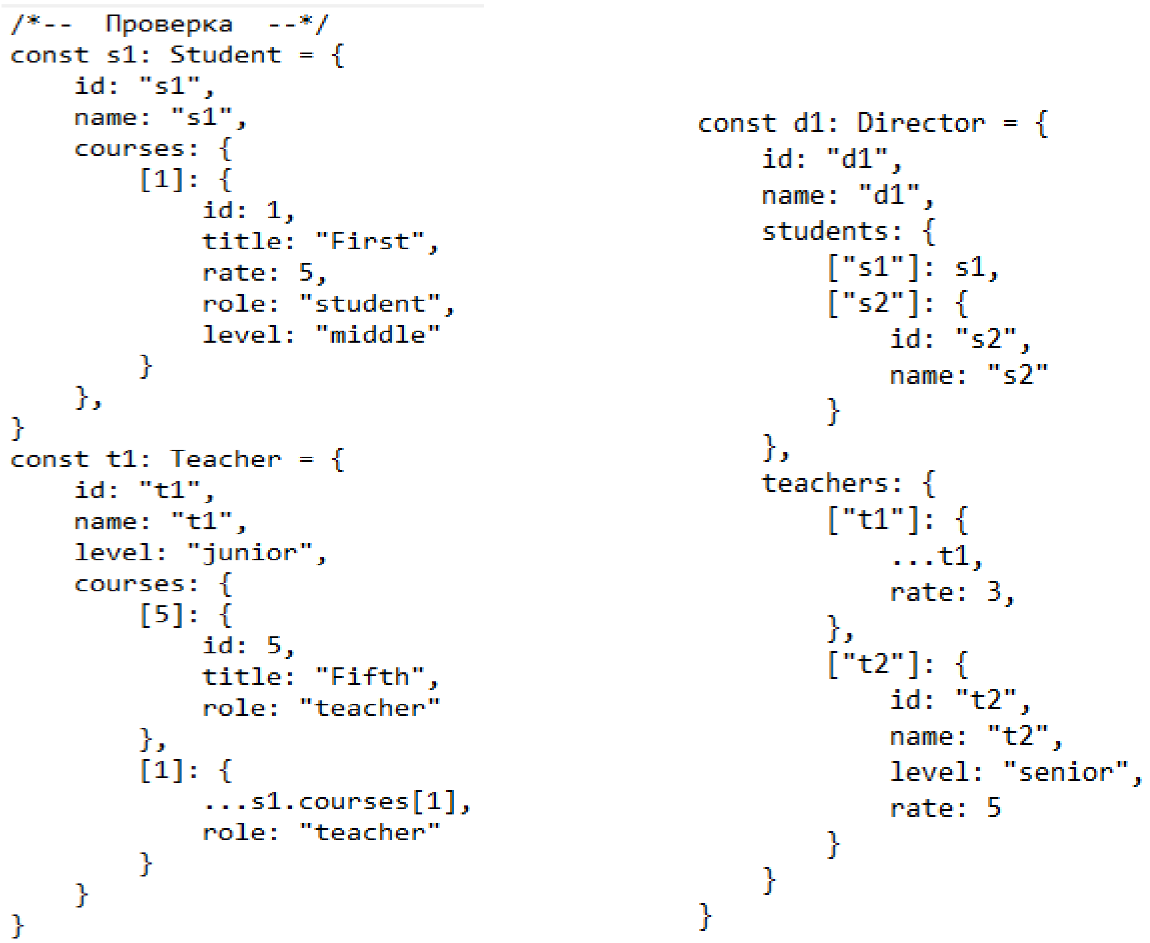


```
[LOG]: "Users:"
[LOG]: " - Max Mustermann, 25"
[LOG]: " - Kate Müller, 23"
```

Задание 2

Исправлен *type Teacher* и *Director*, чтобы пройти проверку *const t1, d1*

```
type User = {
    id: string;
    name: string;
}

type Course = {
    id: number;
    title: string;
}

type WithRate = {
    rate: 1 | 2 | 3 | 4 | 5;
}

type WithStudentRole = {
    role: "student"
}

type WithTeacherRole = {
    role: "teacher"
}

type WithLevel = {
    level: "junior" | "middle" | "senior"
}
/* --- */

type StudentCourse = Course & WithStudentRole & WithRate & WithLevel
type Student = User & { courses: { [id: number]: StudentCourse } }

type TeacherCourse = Course & WithTeacherRole
type Teacher = User & WithLevel & { courses: { [id: number]: TeacherCourse } };

type DirectorCourse = Course & WithStudentRole & WithRate & WithLevel
type Director = User & { students: { [id: string]: Student } & { teachers: { [id: string]: Teacher }}}
```

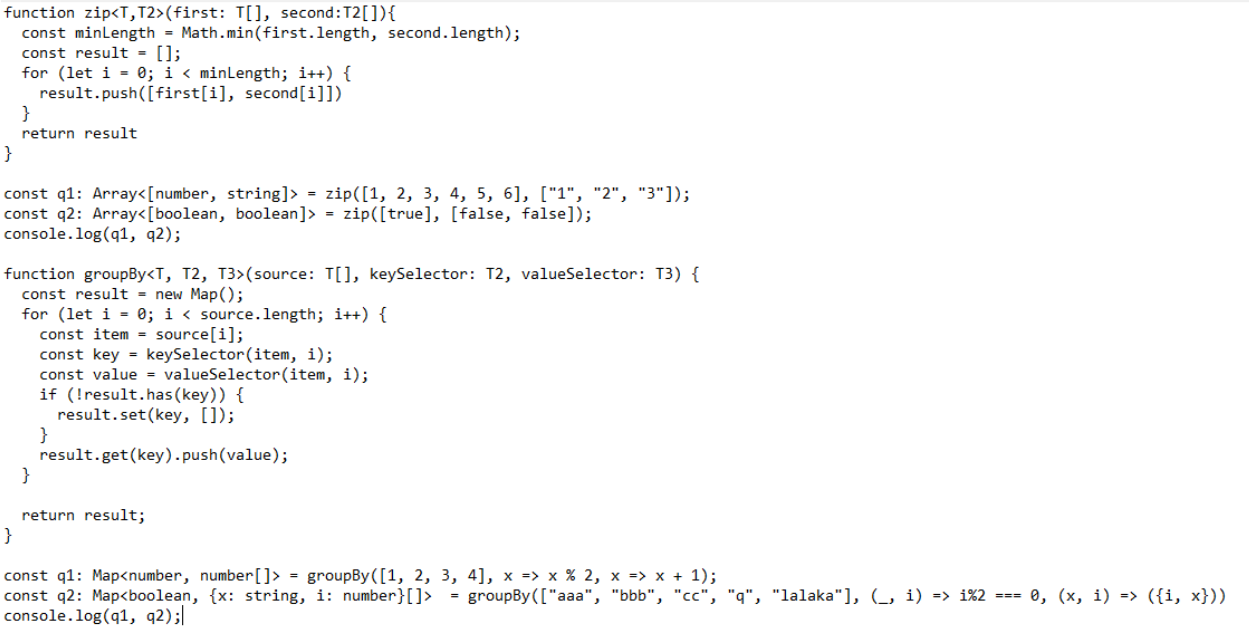


```
/*--  Проверка  --*/
const s1: Student = {
    id: "s1",
    name: "s1",
    courses: {
        [1]: {
            id: 1,
            title: "First",
            rate: 5,
            role: "student",
            level: "middle"
        }
    },
}
const t1: Teacher = {
    id: "t1",
    name: "t1",
    level: "junior",
    courses: {
        [5]: {
            id: 5,
            title: "Fifth",
            role: "teacher"
        },
        [1]: {
            ...s1.courses[1],
            role: "teacher"
        }
    }
}
```

```
const d1: Director = {
    id: "d1",
    name: "d1",
    students: {
        ["s1"]: s1,
        ["s2"]: {
            id: "s2",
            name: "s2"
        }
    },
    teachers: {
        ["t1"]: {
            ...t1,
            rate: 3,
        },
        ["t2"]: {
            id: "t2",
            name: "t2",
            level: "senior",
            rate: 5
        }
    }
}
```

Задание 3

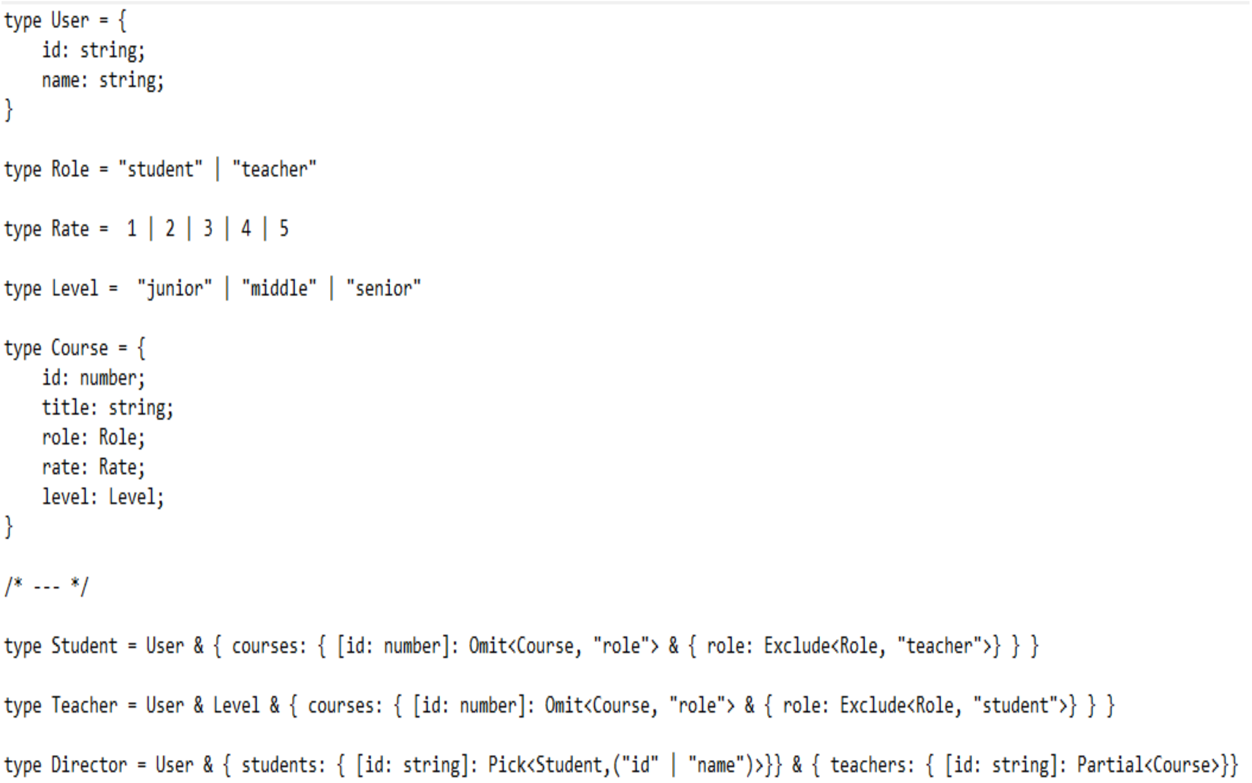
Используем дженерики



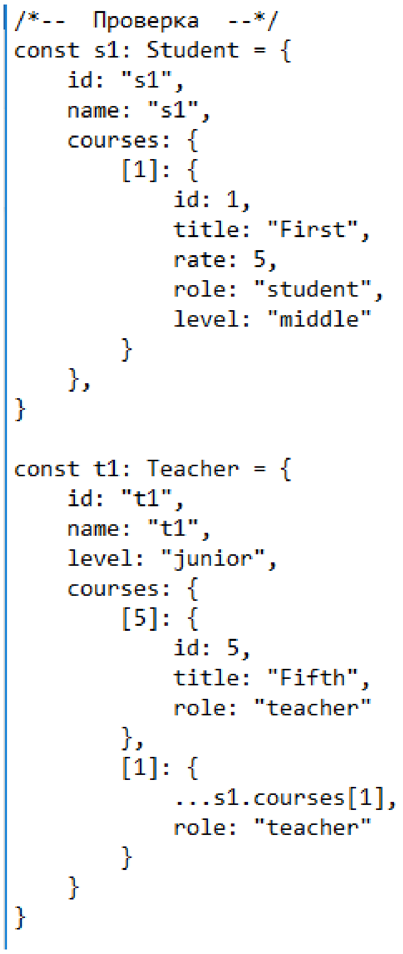
```
function zip<T,T2>(first: T[], second:T2[]){
  const minLength = Math.min(first.length, second.length);
  const result = [];
  for (let i = 0; i < minLength; i++) {
    result.push([first[i], second[i]])
  }
  return result
}

const q1: Array<[number, string]> = zip([1, 2, 3, 4, 5, 6], ["1", "2", "3"]);
const q2: Array<[boolean, boolean]> = zip([true], [false, false]);
console.log(q1, q2);

function groupBy<T, T2, T3>(source: T[], keySelector: T2, valueSelector: T3) {
  const result = new Map();
  for (let i = 0; i < source.length; i++) {
    const item = source[i];
    const key = keySelector(item, i);
    const value = valueSelector(item, i);
    if (!result.has(key)) {
      result.set(key, []);
    }
    result.get(key).push(value);
  }

  return result;
}

const q1: Map<number, number[]> = groupBy([1, 2, 3, 4], x => x % 2, x => x + 1);
const q2: Map<boolean, {x: string, i: number}[]>  = groupBy(["aaa", "bbb", "cc", "q", "lalaka"], (_, i) => i%2 === 0, (x, i) => ({i, x}))
console.log(q1, q2);
```

Задание 4

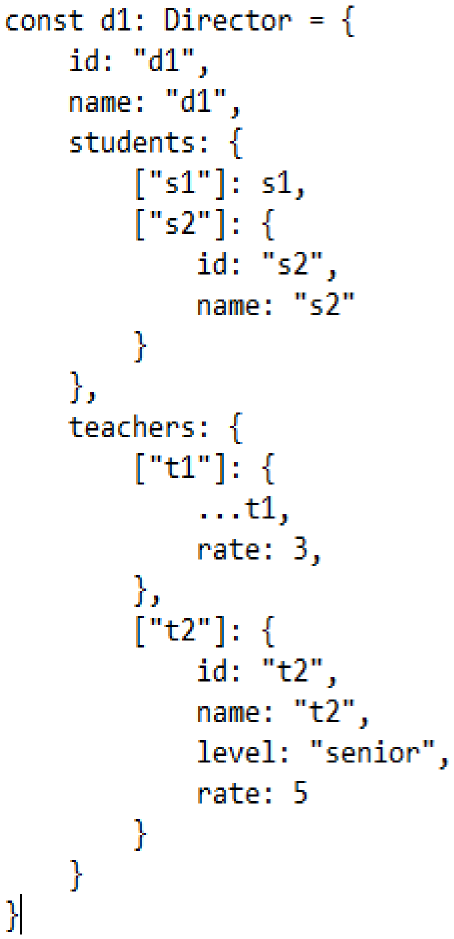
Работа с типами данных



```
type User = {
    id: string;
    name: string;
}

type Role = "student" | "teacher"

type Rate =  1 | 2 | 3 | 4 | 5

type Level =  "junior" | "middle" | "senior"

type Course = {
    id: number;
    title: string;
    role: Role;
    rate: Rate;
    level: Level;
}

/* --- */

type Student = User & { courses: { [id: number]: Omit<Course, "role"> & { role: Exclude<Role, "teacher">} } }

type Teacher = User & Level & { courses: { [id: number]: Omit<Course, "role"> & { role: Exclude<Role, "student">} } }

type Director = User & { students: { [id: string]: Pick<Student,("id" | "name")>}} & { teachers: { [id: string]: Partial<Course>}}
```



```
/*--  Проверка  --*/
const s1: Student = {
    id: "s1",
    name: "s1",
    courses: {
        [1]: {
            id: 1,
            title: "First",
            rate: 5,
            role: "student",
            level: "middle"
        }
    },
}

const t1: Teacher = {
    id: "t1",
    name: "t1",
    level: "junior",
    courses: {
        [5]: {
            id: 5,
            title: "Fifth",
            role: "teacher"
        },
        [1]: {
            ...s1.courses[1],
            role: "teacher"
        }
    }
}
```



```
const d1: Director = {
    id: "d1",
    name: "d1",
    students: {
        ["s1"]: s1,
        ["s2"]: {
            id: "s2",
            name: "s2"
        }
    },
    teachers: {
        ["t1"]: {
            ...t1,
            rate: 3,
        },
        ["t2"]: {
            id: "t2",
            name: "t2",
            level: "senior",
            rate: 5
        }
    }
}
```

Задание 5

Ссылка на гитхаб: