

Create a file called `qabcd.txt` and answer the questions in it.

Label your answers with QA, QB, ...

Submit that file with this command:

`~fardad.soleimanloo/submit oop_qabcd`

Qa - What is an abstract base class? Is there any special type of abstract base class? If there is, what is it called and what is its purpose.

Qb - Having:

```
class Bicycle {
    float wheelsize_;
public:
    Bicycle(float wheelsize_);

    ....
};
```

```
class Engine {
    int displacement_;
public:
    Engine(int displacement);

    ...
};
```

Create a Motorcycle class that is a Bicycle that has an Engine.

Qc – Having the following template:

```
template <typename Type>
void swap(Type* a, Type* b) {
    Type temp = *a;
    *a = *b;
    *b = temp;
}
template <typename Type>
void sort(Type a[], int size, bool ascending = true) {
    int i;
    int j;
    for (i = 0; i < (size - 1); i++) {
        for (j = 0; j < size - i - 1; j++) {
            if (ascending) {
                if (a[j] > a[j + 1]) {
                    swap(&a[j], &a[j + 1]);
                }
            }
            else {

```

```

        if (a[j] < a[j + 1]) {
            swap(&a[j], &a[j + 1]);
        }
    }
}

```

Implement the features for the following Student class so an array of students can be sorted by its name.

```

class Student {
    char* name_;          // name_ is dynamic
    int stno_;
public:
    Student(char name[], int stno);
    ostream display(ostream& os) const;
    istream read(istream& is);
    ~Student();
};

```

Qd - Overload the student class to be printed with cout and read with cin