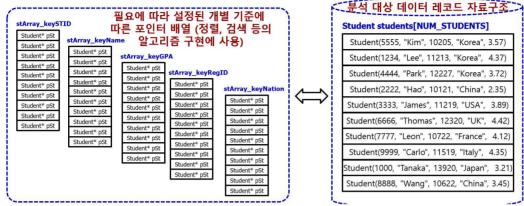
# 2022-2 객체지향형 프로그래밍과 자료구조 Exam2C

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# 2C. class Person, class Student, Template class T\_Array<T, K> 2C.1 기본 개념



#### 2C.2 class Person

```
/* Person.h */
  . . . // 필요한 헤더파일 내용 추가
class Person
{
   friend ostream& operator<< (ostream& fout, const Person& p)</pre>
   {
       . . . . // 직접 구현
public:
   Person() { name = "nobody"; }
   Person(string n) { name = n; }
   . . . . // 필요한 추가 멤버함수가 있는 경우 추가 구현
protected:
   string name;
   int regID; // 주민등록번호
   string nation; // 국가
};
```

- class Person는 데이터 멤버로 이름 (name), 주민등록번호(regID), 국가(nation)을 가짐
- class Person 관련 멤버함수들은 Person.h에 inline 함수로 구현 또는 Person.cpp 파일에 포함시킬 것

#### 2C.3 class Student

```
/* Student.h */
. . . . // include necessary header files and definition

class Student : public Person
{
    friend ostream & operator<< (ostream &, Student &);
public:
    Student(); // default constructor
    Student(int s_id, string n, Date dob, Time avt, double gpa);
    void getKey(string keyName, void* pKey);
    . . . . // 필요한 추가 멤버함수가 있는 경우 추가 구현
private:
    int st_id;
    double gpa;
};
```

- class Student는 class Person으로부터 상속 받음
- class Student 및 관련 함수들은 Student.h에 inline 함수로 구현 또는 Student.cpp 파일에 작성할 것

#### 2C.4 class T Array<T, K>

```
template<typename T, typename K>
class T_Array
public:
    T_Array(int n, string nm); // constructor
    ~T_Array(); // destructor
    int size() { return num_elements; }
    bool empty() { return num_elements == 0; }
    string get_name() { return name; } void insert(int i, T element);
    void selection_sort(string keyName, SortingOrder sortOrder);
    void merge_sort(string keyName, SortingOrder sd);
    void print(int elements_per_line);
    bool isValidIndex(int i);
    T& operator[](int index) { return t array[index]; }
    void mergeSort(T* arr, T* tmp array, int left, int right, string keyName, SortingOrder sortOrder);
    T *t array;
    int num elements;
    int capacity:
    string name;
```

- class T Array<T, K> 정의 및 멤버함수는 모두 T Array.h 파일에 작성할 것

### 2C.5 class T Array<T, K> 기능 시험용 main() 함수 구현

```
// include necessary header files and definitions
#define NUM STUDENTS 10
void main()
           Student students[NUM STUDENTS] =
                      Student(5555, "Kim", 10205, "Korea", 3.57),
                      Student(1234, "Lee", 11213, "Korea", 4.37),
                      Student(4444, "Park", 12227, "Korea", 3.72),
                      Student(2222, "Hao", 10121, "China", 2.35),
                      Student(2222, Hab', 10121, Chilla, 2.33), Student(3333, "James", 11219, "USA", 3.89), Student(6666, "Thomas", 12320, "UK", 4.42), Student(7777, "Leon", 10722, "France", 4.12), Student(9999, "Carlo", 11519, "Italy", 4.35), Student(1000, "Tanaka", 13920, "Japan", 3.21), Student(8888, "Wang", 10622, "China", 3.45),
           };
           Student* pSt;
           T Array<Student*, int> stArray keySTID(NUM STUDENTS, "T Array<Student, keyST ID>");
           for (int i = 0; i < NUM STUDENTS; i++)
                      stArray keySTID.insert(i, &students[i]);
           cout << "T_Array<Student_keyID> at initialization :" << endl;</pre>
           stArray keySTID.print(1);
           stArray_keySTID.selection_sort(string("ST_ID"), INCREASING);
           cout << "\nT Array<Student keyID> after selection sorting (increasing order) by ST ID: " << endl;
           stArray_keySTID.print(1);
           T_Array<Student*, string> stArray_keyName(NUM_STUDENTS, "T_Array<Student, keyName>");
           for (int i = 0; i < NUM STUDENTS; i++)
                      stArray keyName.insert(i, &students[i]);
           stArray_keyName.selection_sort(string("NAME"), INCREASING);
           cout << "T Array<Student, keyName> after selection sorting (increasing order) by Name : " << endl;
           stArray_keyName.print(1);
```

```
T Array<Student*, double> stArray keyGPA(NUM STUDENTS, "T Array<Student, keyGPA>");
for (int i = 0; i < NUM STUDENTS; i++)
{
         stArray keyGPA.insert(i, &students[i]);
stArray keyGPA.selection sort(string("GPA"), DECREASING);
cout << "T Array<Student, keyGPA> after selection sorting (decreasing order) by GPA: " << endl;
stArray keyGPA.print(1);
T Array<Student*, int> stArray keyRegID(NUM STUDENTS, "T Array<Student, keyRegID>");
for (int i = 0; i < NUM STUDENTS; i++)
         stArray_keyRegID.insert(i, &students[i]);
stArray keyRegID.merge sort(string("REGID"), INCREASING);
cout << "\nstArray keyRegID after merge sorting (increasing order) by regID: " << endl;
stArray keyRegID.print(1);
T Array<Student*, string> stArray keyNation(NUM STUDENTS, "T Array<Student, keyNation>");
for (int i = 0; i < NUM STUDENTS; i++)
         stArray keyNation.insert(i, &students[i]);
stArray keyNation.merge sort(string("NATION"), INCREASING);
cout << "\nstArray_keyNation after merge sorting (increasing order) by nation : " << endl;
stArray keyNation.print(1);
```

## 2C.6 T\_Array<T, K>의 기능 시험 결과

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#### 2C.7 결과물 제출

- 바탕화면에 Exam2 폴더내에 Exam2C\_학번\_이름 프로젝트를 생성
- 압축 파일 내에 포함사항 : 작성한 프로젝트, 실행결과 Capture(채점 시 정확한 실행 유무를 확인하기 위함)
- 실행 화면 캡쳐파일은 각 시험 섹션별로 프로젝트 폴더 내에 저장 후 시험 섹션별 폴더별로 압축
- 제출시 .vs 폴더는 삭제 후 문제별 폴더를 압축하여 제출