

Računske vježbe 7

Programiranje II

1. Realizovati klasu **Student** koja sadrži podatke o imenu studenta (niz karaktera), godini studija (cijeli broj) i prosječnoj ocjeni (realni broj), kao i statičku promjenljivu koja sadrži informaciju o ukupnom broju studenata. Klasa sadrži odgovarajuće konstruktore i destruktor, preklopljene operatore dodjele, prefiksnog i postfixnog inkrementiranja (inkrementiranje povećava godinu studija za jedan). Potrebno je realizovati prijateljsku funkciju, koja za proslijeđeni skup studenata treba da odredi niz studenata sa najvećom prosječnom ocjenom na svakoj godini studija i da odštampa ime, godinu studija i prosječnu ocjenu studenata rezultujućeg niza.

```
1 #include <iostream>
2 #include <cstring>
3
4 using namespace std;
5
6 class Student
7 {
8 private:
9     char *name;
10    int year;
11    double grade;
12 public:
13    Student()
14    {
15        name = 0;
16        year = 0;
17        grade = 0;
18        total++;
19    }
20    Student(char *, int, double);
21    Student(const Student &);
22    ~Student()
23    {
24        delete [] name;
25        name = 0;
26        total--;
27    }
28    Student & operator=(const Student &);
29    Student & operator++();
30    Student operator++(int);
31    friend void findAndPrint(Student *, int);
32    void print()
33    {
34        cout << "Ime: " << name << ", Godina: " << year << ", Ocjena: " << grade <<
endl;
35    }
36    static int total;
37 };
38
```

```

39 int Student::total = 0;
40
41 Student::Student(char *_name, int _year, double _grade) : year(_year), grade(_grade)
42 {
43     name = new char[strlen(_name) + 1];
44     strcpy(name, _name);
45     total++;
46 }
47
48 Student::Student(const Student & student) : year(student.year), grade(student.grade)
49 {
50     name = new char[strlen(student.name) + 1];
51     strcpy(name, student.name);
52     total++;
53 }
54
55 Student & Student::operator=(const Student &student)
56 {
57     if(this != &student)
58     {
59         year = student.year;
60         grade = student.grade;
61         delete [] name;
62         name = new char[strlen(student.name) + 1];
63         strcpy(name, student.name);
64     }
65     return *this;
66 }
67
68 Student & Student::operator++()
69 {
70     year++;
71     return *this;
72 }
73
74 Student Student::operator++(int)
75 {
76     Student temp(*this);
77     year++;
78     return temp;
79 }
80
81 void findAndPrint(Student *arr, int length)
82 {
83     Student result[5];
84
85     for(int i = 0; i < 5; i++)
86         result[i] = Student(" ", i + 1, 0); // inicijalizacija "maksimuma"
87     for(int i = 0; i < length; i++) // prolazimo kroz prosljedjeni niz
88         for (int j = 0; j < 5; j++) // prolazimo kroz svaku godinu
89             if(arr[i].year == (j + 1))
90             {
91                 if (arr[i].grade > result[j].grade)
92                     result[j] = arr[i]; // azuriramo najboljeg studenta
93                 break; // student istovremeno moze biti samo na jednoj godini
94             }
95     for(int i = 0; i < 5; i++)
96         result[i].print();
97 }

```

```

98 // Drugi, neoptimizovani nacin
99 /*
100 void findAndPrint(Student *arr, int length)
101 {
102     Student result[5];
103     for(int i = 0; i < 5; i++)
104         result[i] = Student(" ", i + 1, 0);
105     for(int i = 0; i < length; i++)
106     {
107         if(arr[i].year == 1 && arr[i].grade > result[0].grade)
108             result[0] = arr[i];
109         else if(arr[i].year == 2 && arr[i].grade > result[1].grade)
110             result[1] = arr[i];
111         else if(arr[i].year == 3 && arr[i].grade > result[2].grade)
112             result[2] = arr[i];
113         else if(arr[i].year == 4 && arr[i].grade > result[3].grade)
114             result[3] = arr[i];
115         else if(arr[i].year == 5 && arr[i].grade > result[4].grade)
116             result[4] = arr[i];
117     }
118     for(int i = 0; i < 5; i++)
119         result[i].print();
120 }
121 */
122
123 int main()
124 {
125     Student arr[5];
126     int test = 2;
127     char name[20];
128     double grade;
129     int year, n;
130
131     Student a("Marko Markovic", 2, 8.55);
132     Student b;
133     b = a;
134     b.print();
135
136     cout << "Unesite duzinu niza:" << endl;
137     cin >> n;
138
139     cout << "Unesite podatke za studente:" << endl;
140     for(int i = 0; i < n; i++)
141     {
142         cin >> name >> year >> grade;
143         arr[i] = Student(name, year, grade);
144     }
145     findAndPrint(arr, n);
146 }

```