

Final Exam

(120 minutes; 105 min for the exam, 15 min for the submission)
(9.00 to 11.00)

Date: June.15.2021

ŞEREF SÖZÜ BİLDİRGESİ

Onurum ve şerefim üzerinde yemin ederim ki, bu final sınavını kendi başıma yaptım. Sınav süresi boyunca bu sınav ile ilgili olarak kimse ile herhangi bir görüşme, yazışma, elektronik mesajlaşma, sesli görüntülü veya fotoğraf paylaşımli herhangi bir iletişimde bulunmadım.

HONOR CODE STATEMENT

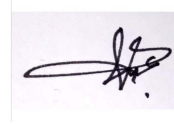
I swear on my honor that I made this final exam on my own. During the exam, I did not make any communication with others such as, text sharing, electronic messaging, audiovisual or photo sharing.

Tarih / Date: 15.06.2021

Ad-Soyad / Name-Surname: Abdulsattar Mouray

Numara / Number: 17015903

İmza / Signature *:



* If you cannot sign it electronically write it (English or Turkish sentences, not both) on a paper and sign it please.

- Please submit your files (zipped or as a pdf) with the suitable names via the system (<https://online.yildiz.edu.tr>) as the official way.
- If you may not be successful to upload it in the duration of exam, then send the documents via programming.kom@gmail.com

1 (25 points) The C++ program below employs conversion from decimal number system to a given number system. Complete the program, write the related code segments {1, 2, 3}

```
//convert.cpp
//conversion form decimal number system to another number system {2:9}
//...
int main(int argc, char*argv[]) // ./test_convert 124 7
//this main() type is required
{
    // Task 1. put all the declarations for the variables
    // related to command line argument conversions (e.g: dNumber and system).

    //decide on the number of the digits after conversion
    int ndigits=1;
    while(dNumber >pow(system, ndigits))
        ndigits ++;
    //e.g: for the decimal number 124 and the given number system 7 'ndigits' will be 3

    const int SIZE=ndigits;
    int newNumber[SIZE]={0};
    // reserve a memory space for the converted number's digits

    // Task 2. do the conversion, store the result in the memory space
    // 'SIZE-1' times,
    // do integer division,
    // and store the remainders and the final quotient as the related digits of output.
    // e.g: 124 in the decimal number system equals to the number 235 in the 7-number system

    // Task 3. display what is done (e.g: (124)(10) = (235)(7))

    return 0;
}
```

(2 files are required: one source file with main and screen image of your run).

1. (40 points) Given `test_Vec.cpp` write the corresponding files to get the required output, **Use only required member functions to get the output, do not oversize your files.**

Hint: Use data members as follows

<pre>//Vec.h ... private: Point* pData; int size;</pre>	<pre>//Point.h ... private: double x; double y;</pre>
<pre>//test_Vec.cpp #include "Point.h" #include "Vec.h" #include <iostream> using namespace std; int main() { Point p1(1.0, 3.0); Point p2(2.0, 1.2); Point p3(3.2, 3.4); Point data1[3] = {p1, p2, p3}; Point data2[3] = {p3, p2, p1}; Point data3[3] = {p1, p2, p3}; Vec v1(data1, 3); v1.print(); Vec v2(data2, 3); v1.print(); Vec v3(data3, 3); v3.print(); v3=v2; v3.print(); v1+=v2; cout << v1; v1[0].print(); }</pre>	<pre>(1.0,3.0) (2.0,1.2) ← v1.print(); (3.2,3.4) (3.2,3.4) (2.0,1.2) ← v2.print(); (1.0,3.0) (1.0,3.0) ← v3.print(); (2.0,1.2) (3.2,3.4) (3.2,3.4) ← v3=v2; v3.print(); (2.0,1.2) (1.0,3.0) (4.2,6.4) ← v1+=v2; cout << v1; (4.0,2.4) (4.2,6.4) (4.2,6.4) ← v1[0].print();</pre>

(5 files are required: 2 header - 2 implementation - screen image of your run).

3 (35 points) Type the Rational Class files (Rational.cpp) and (Rational.h)

```
#include <iostream>
#include "Rational.h"
using namespace std;

int main()
{
    Rational number1;           // 1. use 1 and 1 for numerator and denominator
    Rational number2(1,2);      // 2. use 1 and 2 for numerator and denominator
    Rational number3(number2);  // 3. use numerator and denominator values of number2
    number3.setNumDen(1,4);     // 4. set numerator and denominator with 1 and 4

    number1=number3;           // 4. right hand side operand (number1) is changed
    cout << number1;           // 5. 1/4

    number1+=number3;          // 6. right hand side operand (number1) is changed
    cout << number1;           // 2/4
    number1.simplify();
    // 7. rational number is simplified. You need to find highest common divisor of num. and den.
    cout << number1;           // 1/2

    cout<<( number1 + number2); // 1/1
    // 8. operands of + are not affected
    return 0;
}
```

Hint: Use integer num and den as the data members

(3 files are required: 1 header - 1 implementation - screen image of your run).

Dr. Muharrem Mercimek