LAPORAN PRAKTIKUM
ALGORITMA DAN PEMROGRAMAN

Disusun Oleh:

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PROGRAM STUDI S-1 TEKNIK INFORMATIKA

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

UNIVERSITAS PADJADJARAN

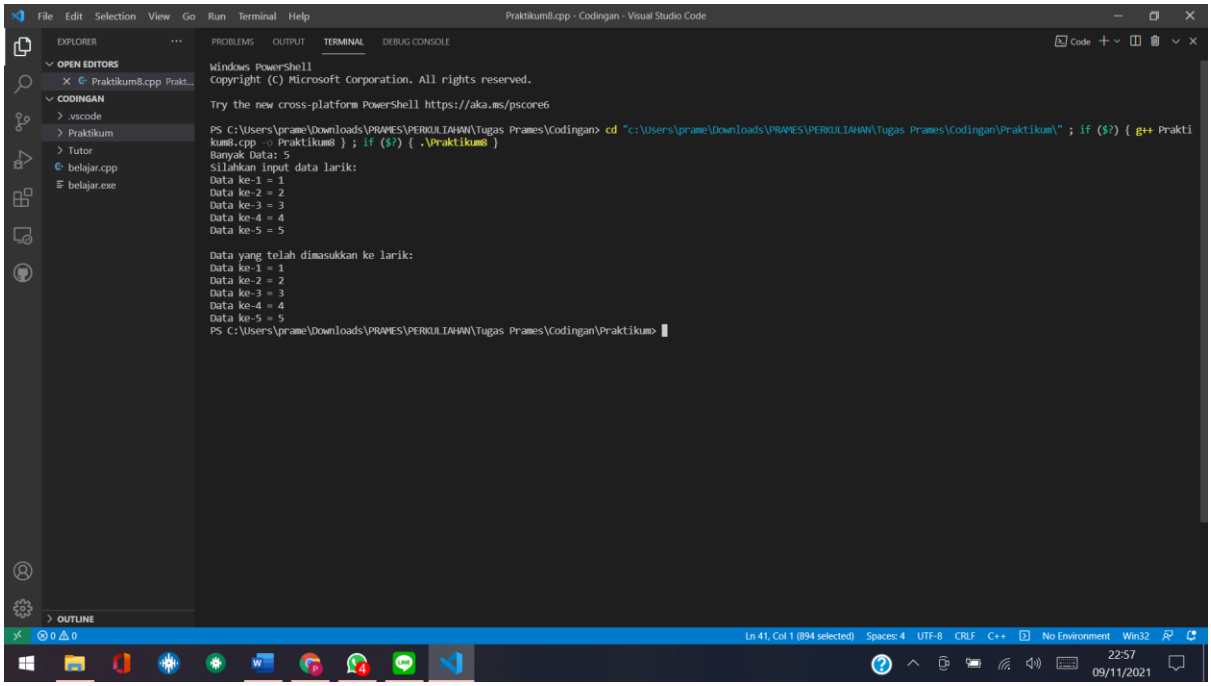
JATINANGOR

2021

A. LATIHAN

1. Latihan 1

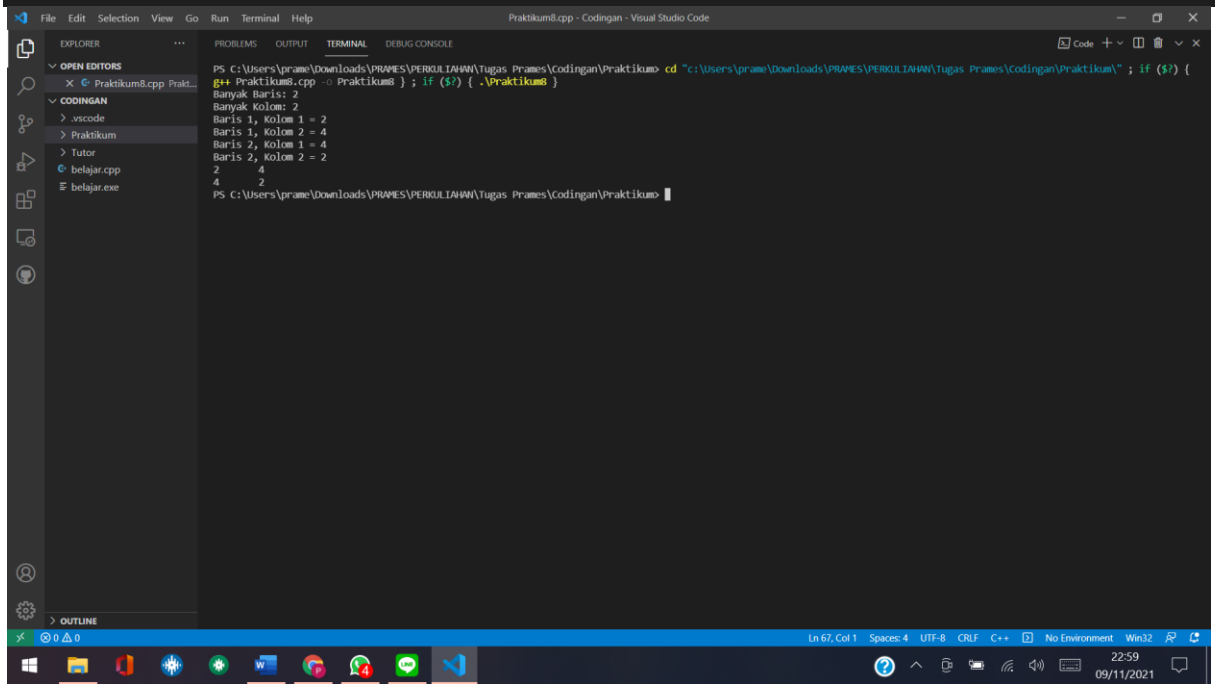
```
/*
Nama Program    : Praktikum8
Nama            : Prames Ray Lapian
NPM             : 140810210059
Tanggal Buat    : 3 November 2021
Deskripsi       : Latihan1
*/

#include <iostream>
using namespace std;

void banyakData(int& n);
void isiLarik(int a[], int n);
void printLarik(int a[], int n);

int main() {
    int x[10];
    int n;
    banyakData(n);
    isiLarik(x, n);
    printLarik(x, n);
}

void banyakData(int& n) {
    cout << "Banyak Data: "; cin >> n;
}

void isiLarik(int a[], int n) {
    cout << "Silahkan input data larik: " << endl;
    for (int i = 0; i < n; i++) {
        cout << "Data ke-" << i + 1 << " = "; cin >> a[i];
    }
}

void printLarik(int a[], int n) {
    cout << "\nData yang telah dimasukkan ke larik: " << endl;
    for (int i = 0; i < n; i++) {
        cout << "Data ke-" << i + 1 << " = " << a[i] << endl;
    }
}
```



2. Latihan 2

```cpp
/*
Nama Program     : Praktikum8
Nama             : Prames Ray Lapian
NPM              : 140810210059
Tanggal Buat     : 3 November 2021
Deskripsi        : Latihan2
*/

#include <iostream>
using namespace std;

typedef int matriks[10][10];

void banyakdata(int& a, int& b);
void isimatriks(matriks x, int a, int b);
void cetakmatriks(matriks x, int a, int b);

int main() {
    matriks x;
    int nbaris, nkolom;
    banyakdata(nbaris, nkolom);
    isimatriks(x, nbaris, nkolom);
    cetakmatriks(x, nbaris, nkolom);
}

void banyakdata(int& a, int& b) {
    cout << "Banyak Baris: "; cin >> a;
    cout << "Banyak Kolom: "; cin >> b;
```

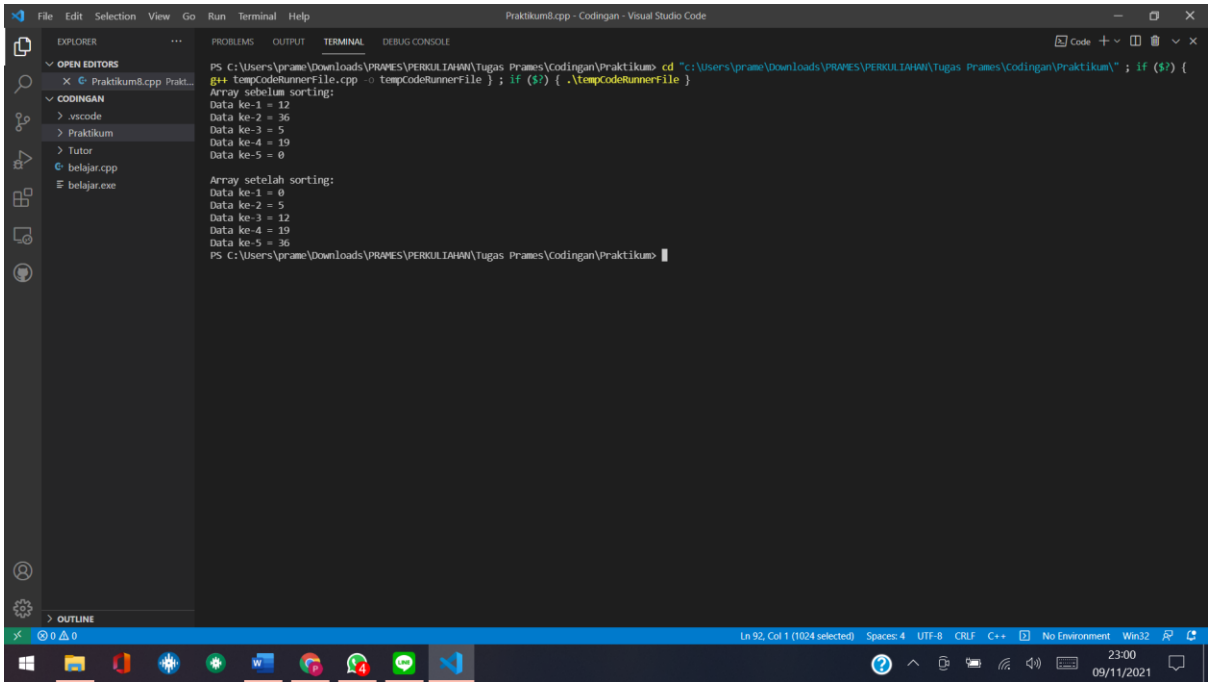
```
}

void isimatriks(matriks x, int a, int b) {
    for (int i = 0; i < a; i++) {
        for (int j = 0; j < b; j++) {
            cout << "Baris " << i + 1 << ", Kolom " << j + 1 << " = ";
            cin >> x[i][j];
        }
    }
}

void cetakmatriks(matriks x, int a, int b) {
    for (int i = 0; i < a; i++) {
        for (int j = 0; j < b; j++) {
            cout << x[i][j] << "\t";
        }
        cout << endl;
    }
}
```



3. Latihan 3

```
/*
Nama Program    : Praktikum8
Nama            : Prames Ray Lapian
NPM             : 140810210059
Tanggal Buat    : 3 November 2021
Deskripsi       : Latihan3
*/
```

```cpp
#include <iostream>
using namespace std;

void swap(int&a, int&b);
void bubblesort(int arr[], int n);
void printarr(int arr[], int n);

int main() {
    int larik[] = {12, 36, 5, 19, 0};
    int n = sizeof(larik)/sizeof(larik[0]);
    cout << "Array sebelum sorting: \n"; printarr(larik, n);
    bubblesort(larik, n);

    cout << "\nArray setelah sorting: \n"; printarr(larik, n);
}

void swap(int& a, int& b){
    int temp = a;
    a = b;
    b = temp;
}

void bubblesort(int arr[], int n) {
    for (int i = 0; i < n - 1; i++) {
        for (int j = 0; j < n - i - 1; j++) {
            if (arr [j] > arr [j + 1])
                swap(arr[j], arr[j + 1]);
        }
    }
}

void printarr(int arr[], int n) {
    for (int i = 0; i < n; i++) {
        cout << "Data ke-" << i + 1 << " = " << arr[i] << endl;
    }
}
```



B. TUGAS

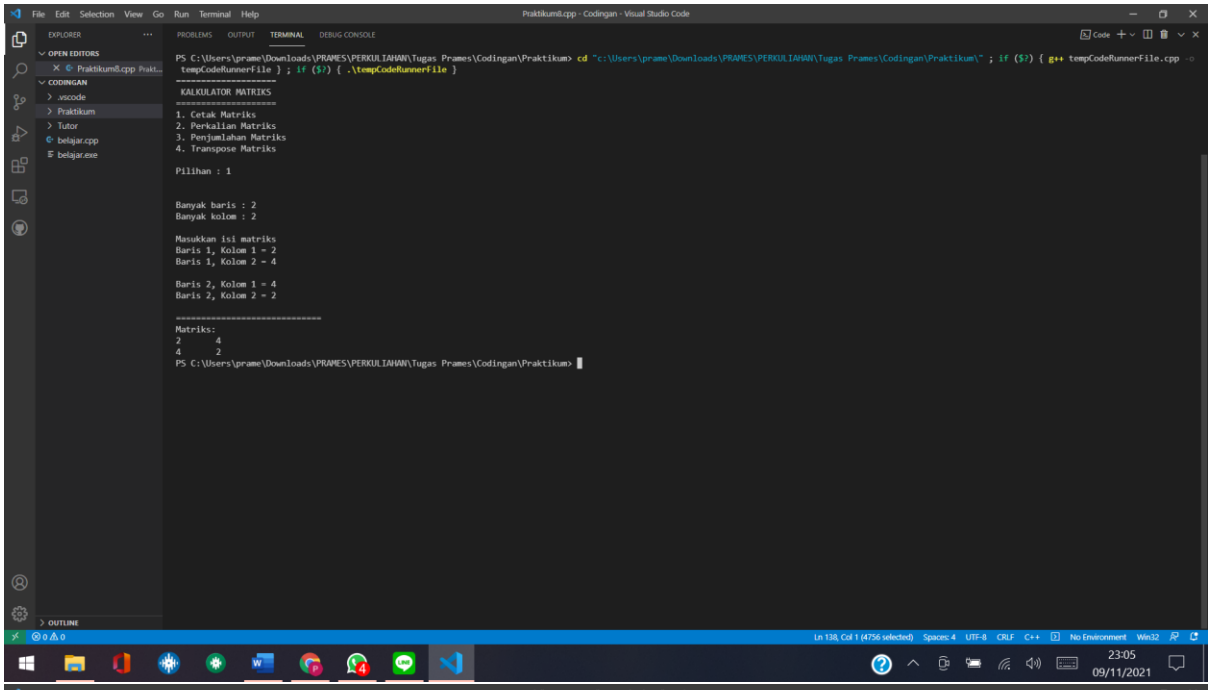
1. Tugas 1

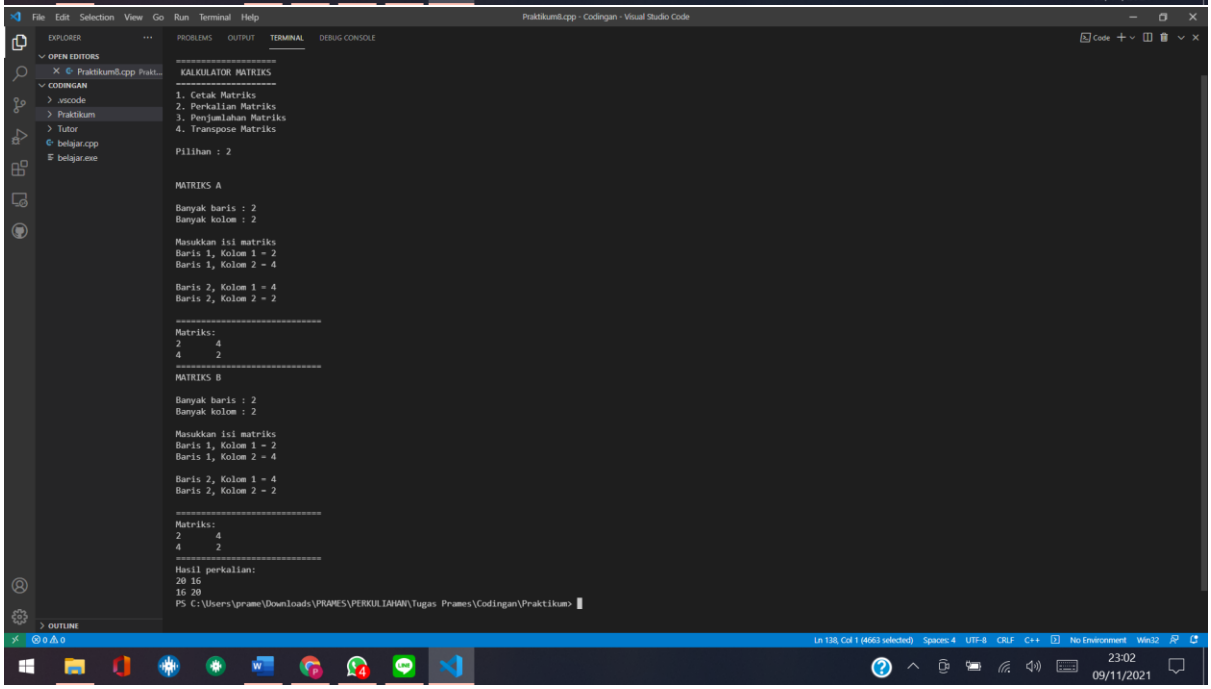
```
/*
Nama Program     : Praktikum8
Nama             : Prames Ray Lapian
NPM              : 140810210059
Tanggal Buat     : 3 November 2021
Deskripsi        : Tugas1
*/

#include <iostream>
using namespace std;

typedef int matriks[15][15];

void isiMatriks(int nBaris, int nKolom, matriks x1) {
    if (nBaris > 0 && nKolom > 0) {
        cout << "\nMasukkan isi matriks\n";

        for (int i = 0; i < nBaris; i++) {
            for (int j = 0 ; j < nKolom ; j++) {
                cout << "Baris " << i+1 << ", Kolom " << j+1 << " = ";
cin >> x1[i][j];
            }
            cout << endl;
        }
    }
}
```

```
void banyakData(int& nBaris, int& nKolom) {
    cout << "Banyak baris : "; cin >> nBaris;
    cout << "Banyak kolom : "; cin >> nKolom;
}

void cetakMatriks(int nBaris, int nKolom, matriks x1) {
    cout << "============================\n"
         << "Matriks:\n";

    for (int i = 0; i < nBaris; i++) {
        for (int j = 0; j < nKolom; j++) {
            cout << x1[i][j] << "\t";
        }
        cout << endl;
    }
}

void penjumlahanMatriks(int nBaris, int nKolom, matriks x1, int
nBaris2, int nKolom2, matriks x2) {
    cout << "MATRIKS A\n\n";
    banyakData(nBaris, nKolom);
    isiMatriks(nBaris, nKolom, x1);
    cetakMatriks(nBaris, nKolom, x1);
    cout << "============================\n"
         << "MATRIKS B\n\n";
    banyakData(nBaris2, nKolom2);

    if (nBaris == nBaris2 && nKolom == nKolom2) {
        isiMatriks(nBaris2, nKolom2, x2);

        for (int i = 0; i < nBaris; i++) {
            for (int j = 0; j < nKolom; j++) {
                x1[i][j] += x2[i][j];
            }
        }

        cetakMatriks(nBaris, nKolom, x1);
        cout << "============================\n"
             << "Hasil penjumlahan:\n";

        for (int i = 0; i < nBaris; i++) {
            for (int j = 0; j < nKolom; j++) {
                cout << x1[i][j] <<" ";
            }
            cout << endl;
        }
    }
```

```
    else {
        cout << "Matriks tidak dapat dijumlahkan.\n";
    }
}

void perkalianMatriks(int nBaris, int nKolom, matriks x1, int nBaris2,
int nKolom2, matriks x2, matriks x3) {
    int hasil = 0;
    cout << "MATRIKS A\n\n";
    banyakData(nBaris, nKolom);
    isiMatriks(nBaris, nKolom, x1);
    cetakMatriks(nBaris, nKolom, x1);
    cout << "============================\n"
         << "MATRIKS B\n\n";

    banyakData(nBaris2, nKolom2);

    if (nKolom == nBaris2 && nBaris == nKolom2) {
        isiMatriks(nBaris2, nKolom2, x2); for(int i = 0; i < nBaris;
i++) {
            for (int j = 0; j < nKolom2; j++) {
                for(int k = 0; k < nBaris2; k++) {
                    hasil = hasil + x1[i][k] * x2[k][j];
                }
                x3[i][j] = hasil;
                hasil = 0;
            }
        }

        cetakMatriks(nBaris, nKolom, x1);
        cout <<"============================\n"
             << "Hasil perkalian: \n";

        for (int i = 0; i < nBaris; i++) {
            for (int j = 0; j < nKolom2; j++) {
                cout << x3[i][j] <<" ";
            }
            cout << endl;
        }
    }
    else {
        cout << "Matriks tidak dapat dikalikan.\n";
    }
}

void transposeMatriks(int nBaris, int nKolom, matriks x1) {
    banyakData(nBaris, nKolom);
    isiMatriks(nBaris, nKolom, x1);
```

```
    cetakMatriks(nBaris, nKolom, x1);
    cout << "============================\n"
         << "Hasil:\n";

    for(int i = 0; i < nKolom; i++) {
        for(int j = 0; j < nBaris; j++) {
            cout << x1[j][i] <<" ";
        }
        cout << endl;
    }
}

int main() {
    int nBaris, nKolom, nBaris2, nKolom2, option; matriks x1, x2, x3;

    cout << "====================\n"
         << " KALKULATOR MATRIKS\n"
         << "====================\n";
    cout << "1. Cetak Matriks\n"
         << "2. Perkalian Matriks\n"
         << "3. Penjumlahan Matriks\n"
         << "4. Transpose Matriks\n";

    cout << "\nPilihan : "; cin >> option;
    cout << "\n\n";
    switch (option){
        case 1:
            banyakData(nBaris, nKolom);
            isiMatriks(nBaris, nKolom, x1);
            cetakMatriks(nBaris, nKolom, x1);
        break;
        case 2:
            perkalianMatriks( nBaris, nKolom, x1, nBaris2, nKolom2, x2,
x3);
        break;
        case 3:
            penjumlahanMatriks(nBaris, nKolom, x1, nBaris2, nKolom2,
x2);
        break;
        case 4:
            transposeMatriks(nBaris, nKolom, x1);
        break;
        default:
        break;
    }
}
```


File Edit Selection View Go Run Terminal Help
Praktikum8.cpp - Codingan - Visual Studio Code
EXPLORER
OPEN EDITORS
Praktikum8.cpp Prakt...
CODINGAN
.vscode
Praktikum
Tutor
belajar.cpp
belajar.exe
OUTLINE
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
PS C:\Users\prame\Downloads\PRAMES\PERKULIAHAN\Tugas Prames\Codingan\Praktikum> cd "c:\Users\prame\Downloads\PRAMES\PERKULIAHAN\Tugas Prames\Codingan\Praktikum\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
==========
KALKULATOR MATRIKS
==========
1. Cetak Matriks
2. Perkalian Matriks
3. Penjumlahan Matriks
4. Transpose Matriks
Pilihan : 1
Banyak baris : 2
Banyak kolom : 2
Masukkan isi matriks
Baris 1, Kolom 1 = 2
Baris 1, Kolom 2 = 4
Baris 2, Kolom 1 = 4
Baris 2, Kolom 2 = 2
==========
Matriks:
2 4
4 2
PS C:\Users\prame\Downloads\PRAMES\PERKULIAHAN\Tugas Prames\Codingan\Praktikum>
Ln 138, Col 1 (4756 selected) Spaces: 4 UTF-8 CRLF C++ No Environment Win32
23:05
09/11/2021


File Edit Selection View Go Run Terminal Help
Praktikum8.cpp - Codingan - Visual Studio Code
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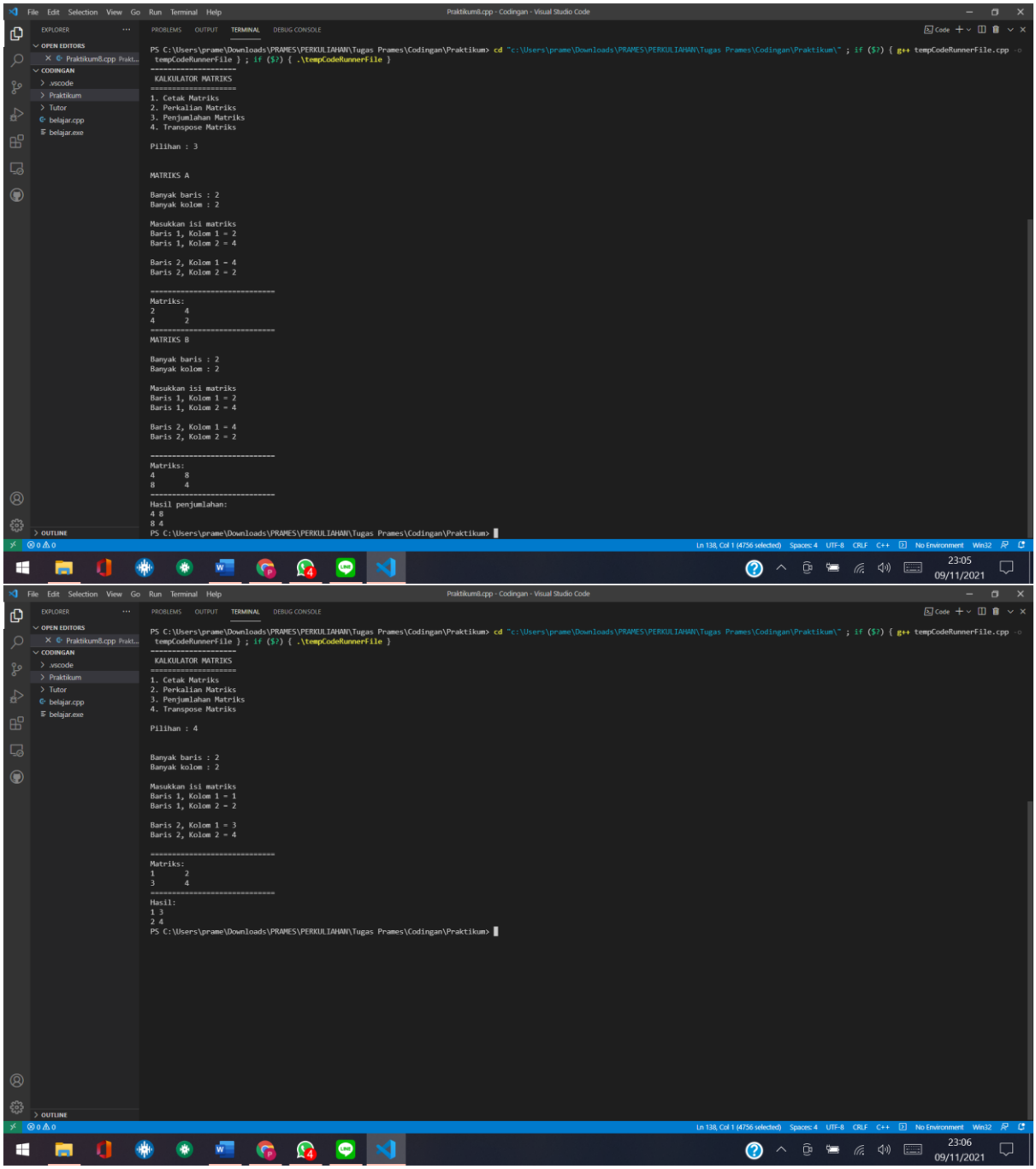
CODINGAN
.vscode
Praktikum
Tutor
belajar.cpp
belajar.exe
OUTLINE
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
==========
KALKULATOR MATRIKS
==========
1. Cetak Matriks
2. Perkalian Matriks
3. Penjumlahan Matriks
4. Transpose Matriks
Pilihan : 2
MATRIKS A
Banyak baris : 2
Banyak kolom : 2
Masukkan isi matriks
Baris 1, Kolom 1 = 2
Baris 1, Kolom 2 = 4
Baris 2, Kolom 1 = 4
Baris 2, Kolom 2 = 2
==========
Matriks:
2 4
4 2
==========
MATRIKS B
Banyak baris : 2
Banyak kolom : 2
Masukkan isi matriks
Baris 1, Kolom 1 = 2
Baris 1, Kolom 2 = 4
Baris 2, Kolom 1 = 4
Baris 2, Kolom 2 = 2
==========
Matriks:
2 4
4 2
==========
Hasil perkalian:
20 16
16 20
PS C:\Users\prame\Downloads\PRAMES\PERKULIAHAN\Tugas Prames\Codingan\Praktikum>
Ln 138, Col 1 (4663 selected) Spaces: 4 UTF-8 CRLF C++ No Environment Win32
23:02
09/11/2021



2. Tugas 2

```
/*
Nama Program     : Praktikum8
Nama             : Prames Ray Lapian
NPM              : 140810210059
Tanggal Buat     : 3 November 2021
Deskripsi        : Tugas2
*/

#include <iostream>
```

```cpp
using namespace std;

void BanyakData(int& x) {
    cout << "Masukan banyak array: ";
    cin >> x;
}

void InputAngka(int arr[], int x) {
    for (int i = 0; i < x; i++) {
        cout << "Masukan angka ke " << i+1 << " : ";
        cin >> arr[i];
        cout << endl;
    }
}

void Insertion(int arr[], int x) {
    int i, j;
    for (int i = 1; i < x; i++) {
        int key = arr[i];
        int j = i - 1;
        while (j >= 0 && arr[j] > key) {
            arr[j+1] = arr[j];
            j--;
        }
        arr[j+1] = key;
    }
}

void Selection(int arr[], int x) {
    int i, j, temp, pos;
    for (int i = 0; i < x-1; i++) {
        pos = i;
        int temp;

        for(int j = i+1; j < x; j++) {
            if(arr[j] < arr[pos]){
                pos = j;
            }
        }
        temp = arr[pos];
        arr[pos] = arr[i];
        arr[i] = temp;
    }
}

void merge(int arr[], int l, int m, int r)
{
    int i, j, k;
```

```
    int x1 = m - l + 1;
    int x2 = r - m;

    int L[x1], R[x2];

    for (i = 0; i < x1; i++)
        L[i] = arr[l + i];
    for (j = 0; j < x2; j++)
        R[j] = arr[m + 1 + j];

    i = 0;
    j = 0;
    k = l;
    while (i < x1 && j < x2)
    {
        if (L[i] <= R[j])
        {
            arr[k] = L[i];
            i++;
        }
        else
        {
            arr[k] = R[j];
            j++;
        }
        k++;
    }

    while (i < x1)
    {
        arr[k] = L[i];
        i++;
        k++;
    }

    while (j < x2)
    {
        arr[k] = R[j];
        j++;
        k++;
    }
}
void MergeSort(int arr[], int l, int r)
{
    if (l < r)
    {
        int m = l + (r - l) / 2;
        MergeSort(arr, l, m);
```

```
        MergeSort(arr, m + 1, r);
        merge(arr, l, m, r);
    }
}

void OutputHasil(int arr[], int x) {
    int h;
    cout << "Hasil Ascending: " << endl;
    for (int h = 0; h < x; h++) {
        cout << arr[h] << " ";
    }
}

int main(){
    int h, i, j, x;
    BanyakData(x);
    int arr[x];
    InputAngka(arr, x);
    //Silahkan dipilih!
    //Insertion(arr, x);
    //Selection(arr, x);
    //MergeSort(arr, 0, x);
    OutputHasil(arr, x);
}
```