

**LAPORAN TUGAS KECIL III IF2211 STRATEGI ALGORITMA**  
**Implementasi Algoritma A\* untuk Menentukan Lintasan Terpendek**



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**2021**

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## 1. Source code

**Method GetStraightDistance()** (Mencari jarak garis lurus untuk dipakai secara heuristik)

```
1 reference
private double GetStraightDistance(string pos1, string pos2) {
    int index1 = GetIndexFromNameList(pos1);
    int index2 = GetIndexFromNameList(pos2);

    double PositionDeltaX = positionLocation[index1].Item1 - positionLocation[index2].Item1;
    double PositionDeltaY = positionLocation[index1].Item2 - positionLocation[index2].Item2;

    return (double) Math.Sqrt(PositionDeltaX*PositionDeltaX + PositionDeltaY*PositionDeltaY);
}
```

*Gambar 1.1 - Method GetStraightDistance()*

**Method PathfindAStar()** (Algoritma utama A\*)

```
// Pathfinding!!~
while (currentLocationName != currentTargetFriend) {!!~

    // Creating branch only if not backtracking!!~
    // Get sorted distance and put to choice stack!!~
    if (!isBacktracking) {!!~
        // List carrying tuple of target location name, distance to, and heuristic value!!~
        List<Tuple<string,float,float>> distanceList = new List<Tuple<string,float,float>>();!!~
        for (int i = 0; i < nameList.Length; i++) {!!~
            if (currentLocationIndex != i && !visited[nameList[i]] && adjacencyMatrix[currentLocationIndex,i] >= 0) {!!~
                distanceList.Add(new Tuple<string, float, float> (nameList[i], adjacencyMatrix[currentLocationIndex,i],!!~
                    GetStraightDistance(currentTargetFriend, nameList[i])));!!~
            }!!~
        }!!~
        // Sorting list with Linq, ascending order!!~
        List<Tuple<string,float,float>> sortedDistance = distanceList.OrderBy(obj=>obj.Item3).ToList();!!~

        // Creating available path queue from sorted list!!~
        Queue<Tuple<string,float>> AvailableBranch = new Queue<Tuple<string,float>>();!!~
        foreach (var entry in sortedDistance) {!!~
            AvailableBranch.Enqueue(new Tuple<string,float>(entry.Item1, entry.Item2));!!~
        }!!~

        // Push available path queue to choice stack!!~
        ChoiceStack.Push(AvailableBranch);!!~
    }!!~
}
```

```

    ...// Move taking
    ...if (ChoiceStack.Count != 0) {
    ...    // If choice stack is not exhausted
    ...    Queue<Tuple<string,float>> TopMostBranch = ChoiceStack.Peek();
    ...    if (TopMostBranch.Count != 0) {
    ...        // If choice queue in choice stack is not empty,
    ...        // Move to that location
    ...        currentLocationName = TopMostBranch.Peek().Item1;
    ...        currentIndex = GetIndexFromNameList(currentLocationName);
    ...        float currentPathWeight = TopMostBranch.Peek().Item2;
    ...        TotalPathWeight += currentPathWeight;
    ...        TopMostBranch.Dequeue();

    ...        isBacktracking = false;
    ...        // | Trying new path, so algorithm is stopped backtracking
    ...        CurrentTraversedRoute.Push(new Tuple<string,float>(currentLocationName, currentPathWeight));
    ...        // | Put selected path to route stack
    ...        visited[currentLocationName] = true;
    ...        // | Flagging location as visited
    ...    }
    ...    else {
    ...        // If choice queue is empty, pop choice stack and backtrack
    ...        ChoiceStack.Pop();
    ...        isBacktracking = true;
    ...        // | Set mode to backtracking
    ...        visited[currentLocationName] = false;
    ...    }
    ...    else {
    ...        // If choice queue is empty, pop choice stack and backtrack
    ...        ChoiceStack.Pop();
    ...        isBacktracking = true;
    ...        // | Set mode to backtracking
    ...        visited[currentLocationName] = false;
    ...        // | Backtracking, removing old path visited flags
    ...        // string LastLocation = CurrentTraversedRoute.Peek(); // DEBUG
    ...        TotalPathWeight -= CurrentTraversedRoute.Peek().Item2;
    ...        CurrentTraversedRoute.Pop();
    ...        // | Remove last path from route stack
    ...    }
    ...}
    ...else {
    ...    // If choice stack is exhausted, then no path found
    ...    System.Windows.Forms.MessageBox.Show("Path not found", "Alert");
    ...    isSolutionFound = false;
    ...    break;
    ...}
}

```

*Gambar 1.2 - Method PathfindAStar()*

## 2. Input file

```
Pizza_Hut_Buahbatu -1 1050 685.48 293.37 179.66 -1 -1 -1
.....
RSAI_Buahbatu 1050 -1 -1 -1 -1 -1 -1 -1
.....
Mandiri_University 685.48 -1 -1 -1 -1 -1 -1 -1
.....
Metro_Indah_Mall 293.37 -1 -1 -1 -1 -1 -1 -1
.....
Gudang_Garam 179.66 -1 -1 -1 -1 -1 -1 -1
.....
Edelweiss_Hospital -1 -1 459.26 -1 -1 -1 501.05 505.03
.....
Alfamart -1 -1 -1 -1 -1 501.05 -1 375.96
.....
KPU_Bandung -1 -1 -1 -1 -1 505.03 375.96 -1
.....
Pizza_Hut_Buahbatu -6.94010 107.65981
.....
RSAI_Buahbatu -6.93897 107.66913
.....
Mandiri_University -6.94214 107.65392
.....
Metro_Indah_Mall -6.94214 107.65874
.....
Gudang_Garam -6.93881 107.66059
.....
Edelweiss_Hospital -6.94351 107.64964
.....
Alfamart -6.94398 107.64856
.....
KPU_Bandung -6.94437 107.64569
.....
```

Gambar 2.1 - Input File Buahbatu

```
ITB_Belakang -1 235.34 -1 -1 -1 1160 473.47 -1
.....
Jl_Ir_H_Juanda-Dago 235.35 -1 428.15 721.88 -1 -1 -1 261.92
.....
Kantor_Cabang_BCA -1 428.15 -1 302.61 -1 -1 -1 -1
.....
RS_Borromeus -1 721.88 302.61 -1 293.75 -1 -1 -1
.....
ITB_Depan -1 -1 -1 293.75 -1 229.62 -1 -1
.....
Jl_Tamansari 1160 -1 -1 -1 229.62 -1 1030 -1
.....
Sabuga 473.47 -1 -1 -1 -1 1030 -1 -1
.....
Mc_Donald_Dago -1 261.92 -1 -1 -1 -1 -1 -1
.....
ITB_Belakang -6.88731 107.61146
.....
Jl_Ir_H_Juanda-Dago -6.88743 107.61357
.....
Kantor_Cabang_BCA -6.89121 107.61377
.....
RS_Borromeus -6.89377 107.61296
.....
ITB_Depan -6.89323 107.61046
.....
Jl_Tamansari -6.89386 107.60840
.....
Sabuga -6.88648 107.60752
.....
Mc_Donald_Dago -6.88487 107.61345
.....
```

Gambar 2.2 - Input File ITB/Dago

```

Alun_Alun -1 721.11 -1 492.00 692.44 1780 -1 -1
Bank_Mandiri_Asia_Afrika 721.11 -1 162.53 -1 -1 -1 688.07 -1
Wings_o_wings -1 162.53 -1 429.96 -1 -1 514.46 -1
Taman_Braga 492.00 -1 429.96 -1 742.20 1810 -1 -1
Hotel_Pasar_Baru 692.44 -1 -1 742.20 -1 1810 1780 -1
Terminal_Tegallega 1780 -1 -1 -1 1810 -1 -1 -1
Perempatan_Jl_Sunda -1 688.07 514.46 -1 1780 -1 -1 512.15
Perempatan_Jl_Jawa -1 -1 -1 -1 -1 -1 512.15 -1
Alun_Alun -6.92118 107.60714
Bank_Mandiri_Asia_Afrika -6.92175 107.61348
Wings_o_wings -6.92062 107.61393
Taman_Braga -6.91976 107.60998
Hotel_Pasar_Baru -6.91757 107.60445
Terminal_Tegallega -6.93382 107.60287
Perempatan_Jl_Sunda -6.92237 107.61756
Perempatan_Jl_Jawa -6.91592 107.61839

```

*Gambar 2.3 - Input File Alun-alun Bandung*

```

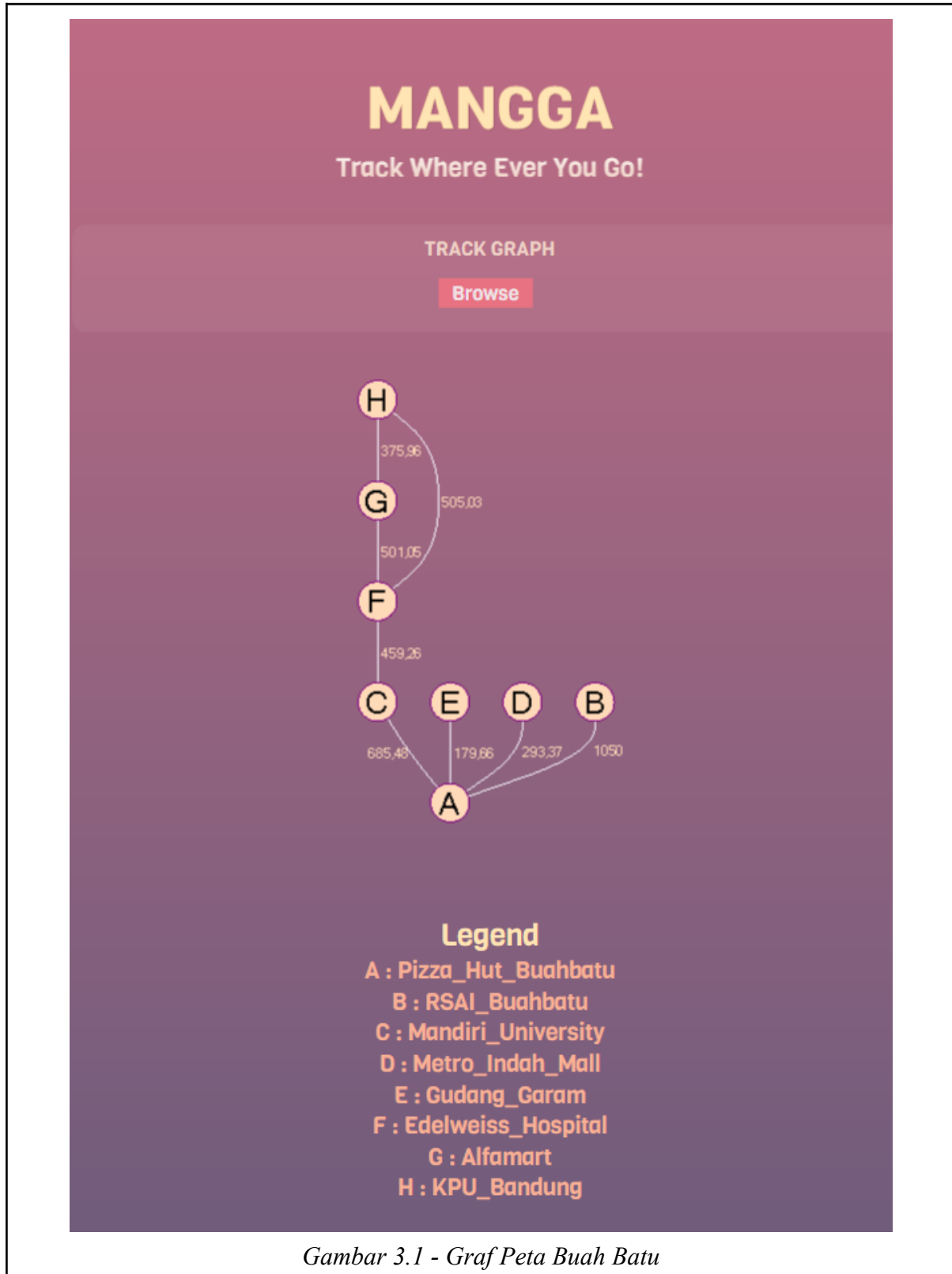
Monkasel -1 830.12 266.68 -1 -1 -1 -1 -1
Grand_city 830.12 -1 492.83 -1 -1 -1 594.66 -1
Stasiun_Gubeng 266.68 492.83 -1 -1 979.18 -1 -1 -1
Masjid_Cheng_Hoo -1 -1 -1 -1 -1 1860 1210 -1
RS_Dr_Sutomo -1 -1 979.18 -1 -1 876.93 -1 -1
Pasar_Pacarkeling -1 -1 -1 1860 876.93 -1 -1 -1
Sate_Kelopo_Ondomohen -1 594.66 -1 1210 -1 -1 -1 1150
Tunjungan -1 -1 -1 -1 -1 -1 -1 1150
Monkasel -7.26544 112.75028
Grand_city -7.26193 112.74997
Stasiun_Gubeng -7.26546 112.75200
Masjid_Cheng_Hoo -7.25199 112.74717
RS_Dr_Sutomo -7.26793 112.75676
Pasar_Pacarkeling -7.25995 112.75909
Sate_Kelopo_Ondomohen -7.26011 112.74419
Tunjungan -7.25612 112.73778

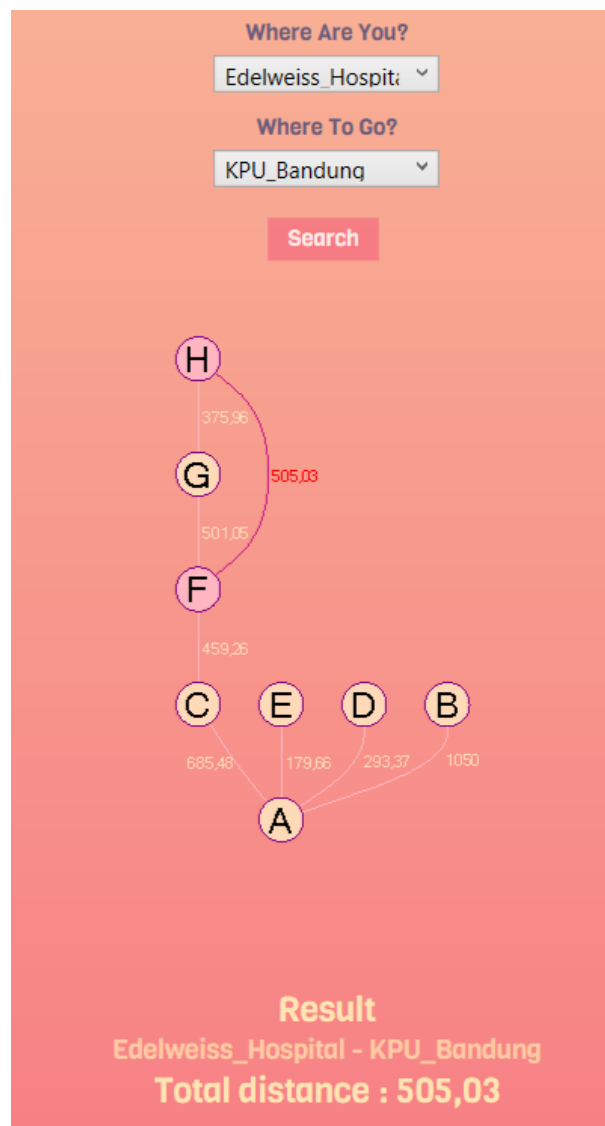
```

*Gambar 2.4 - Input File Pusat Kota Surabaya*

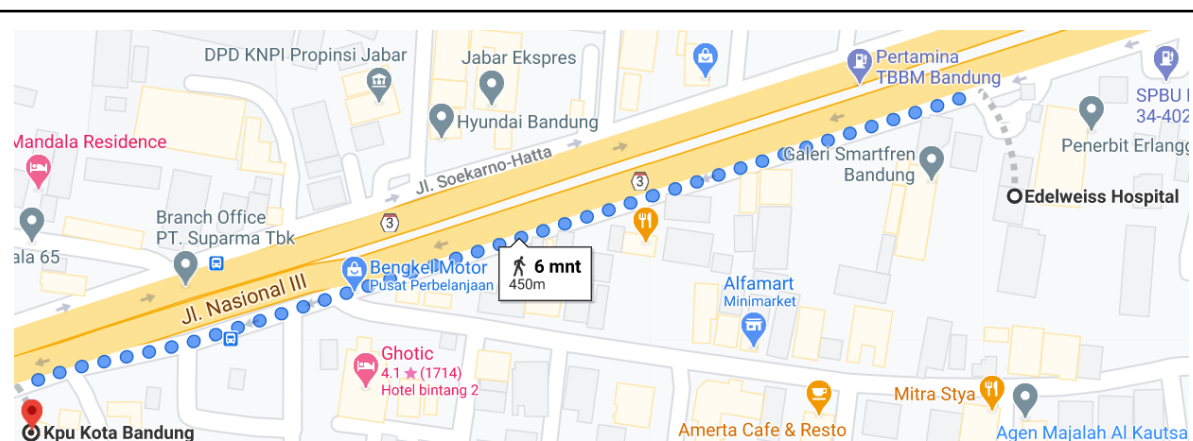
### 3. Lintasan terpendek

#### 3.1. Daerah Buah Batu



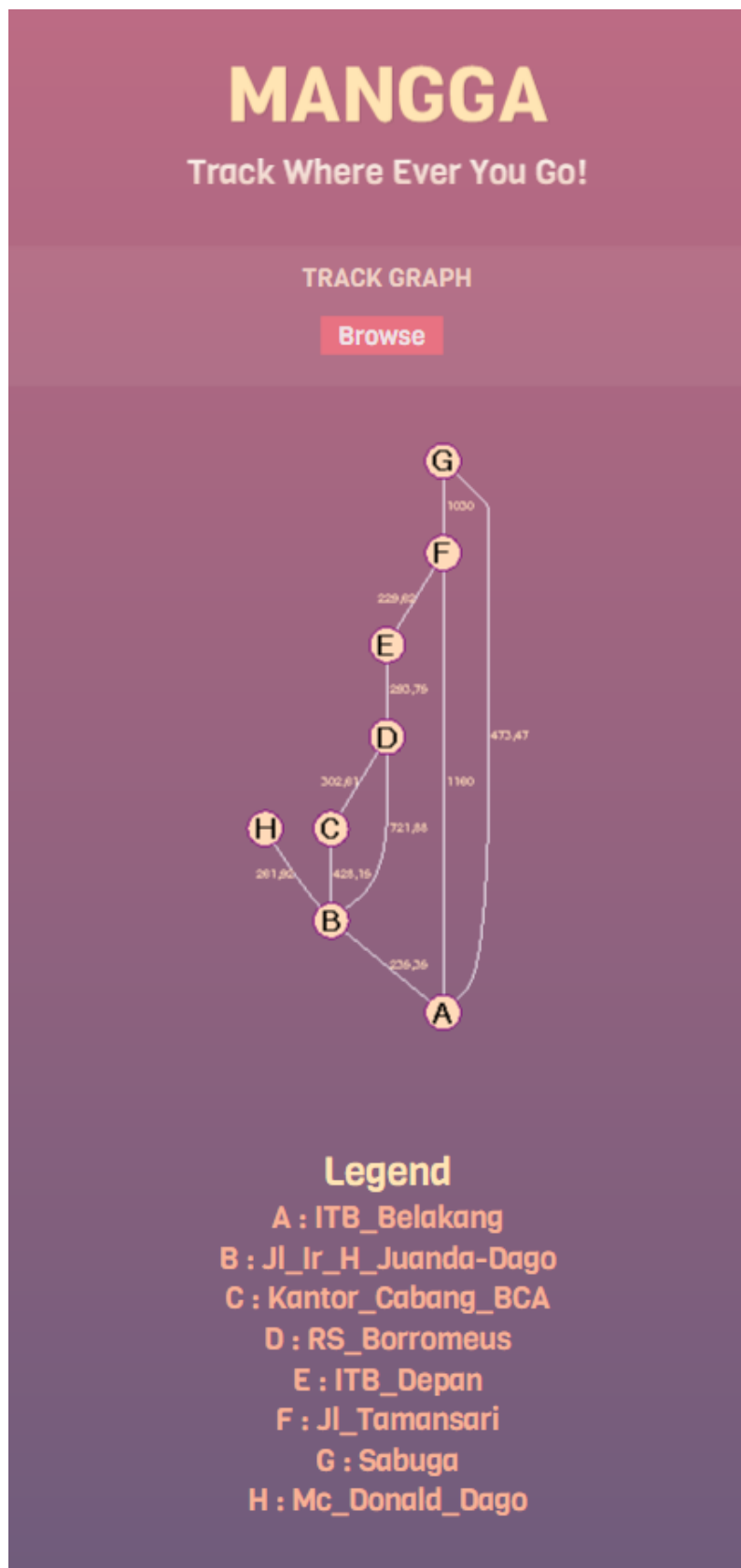


Gambar 3.2 - Edelweiss - KPU



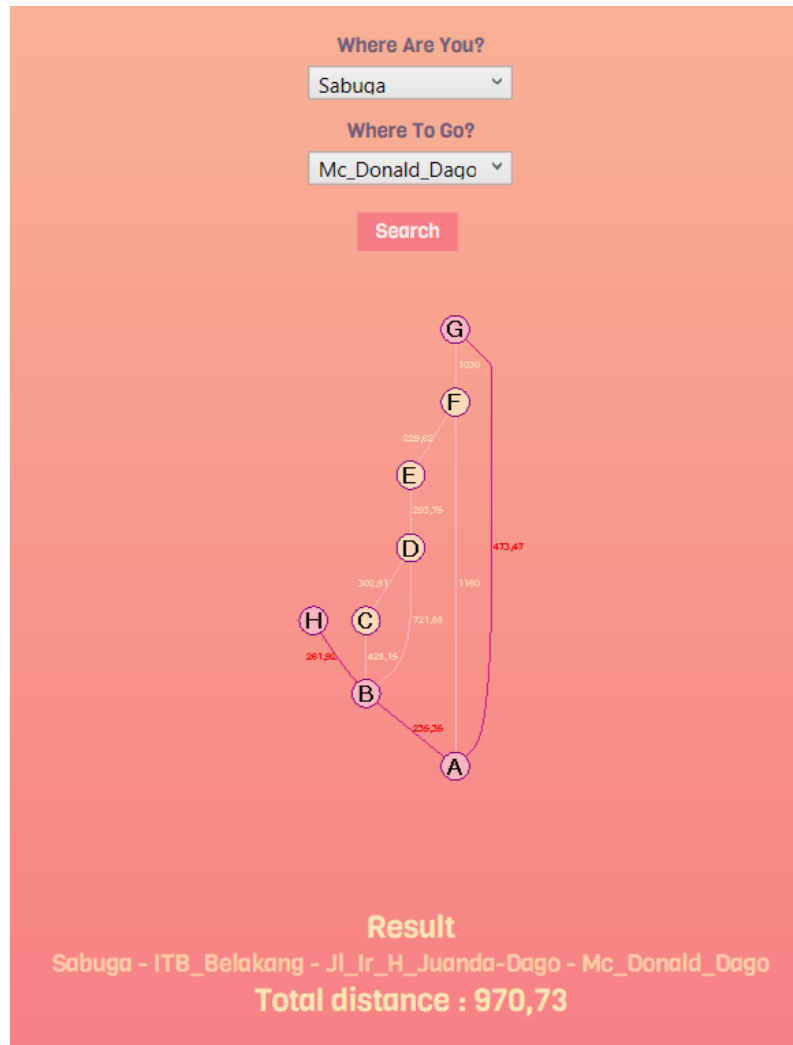
Gambar 3.3 - Google Map Edelweiss - KPU

### 3.2. Daerah ITB/Dago

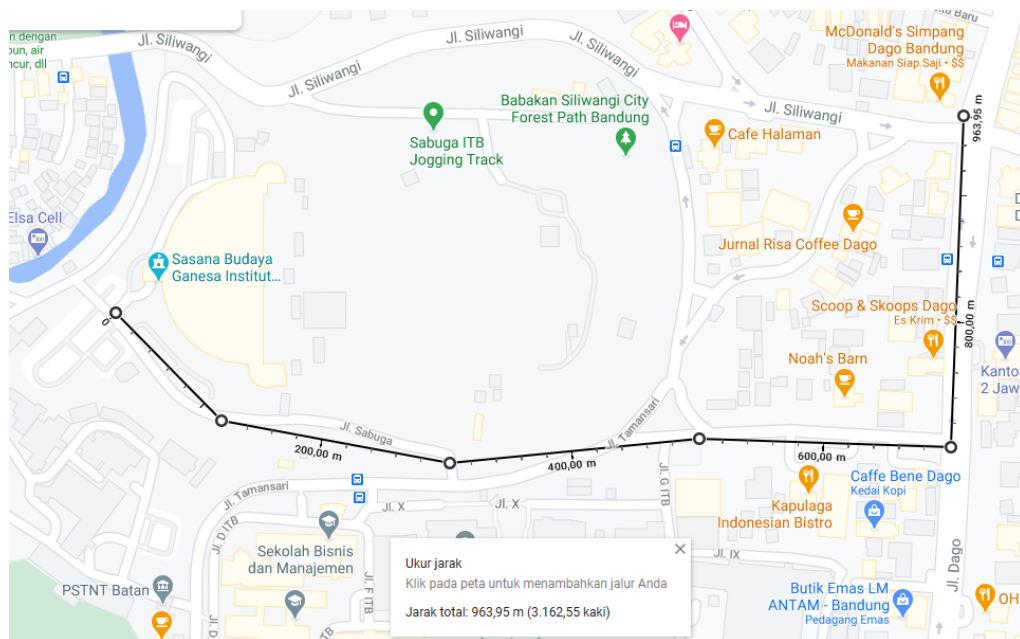


Gambar 3.4 - Kampus ITB/Dago



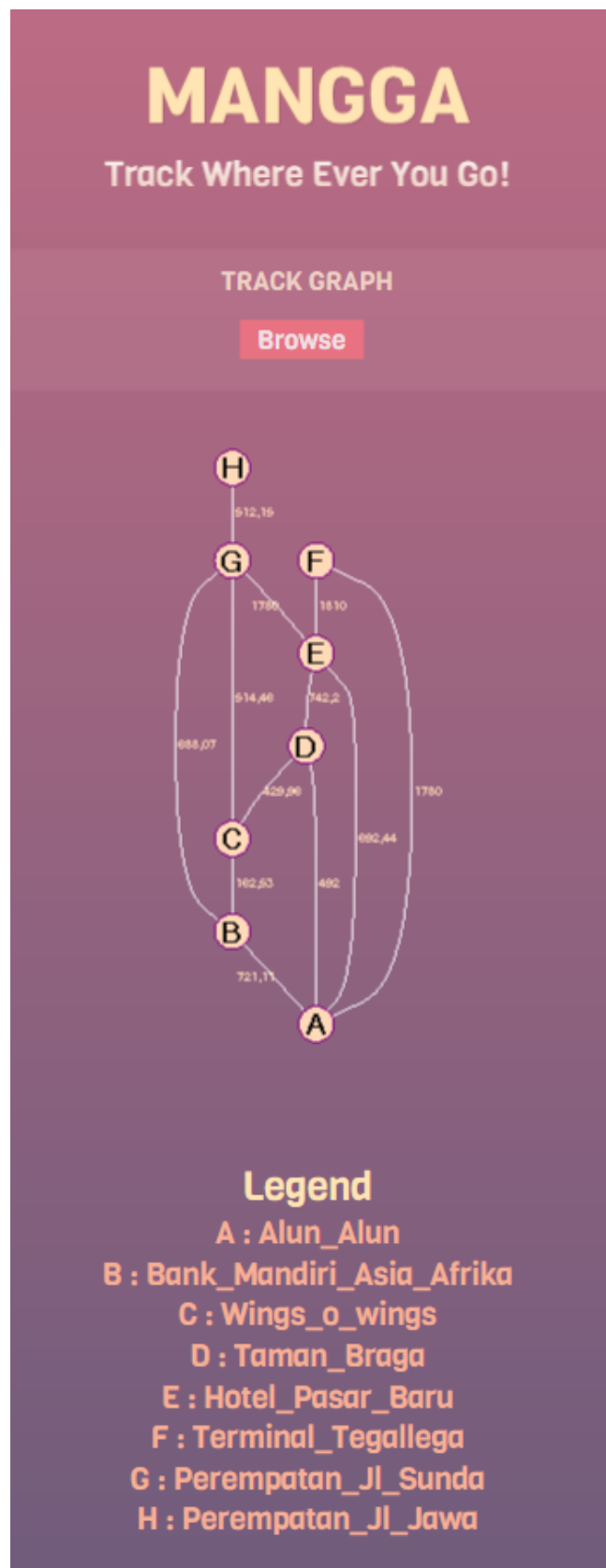


Gambar 3.5 - Sabuga - Mcdonald Dago

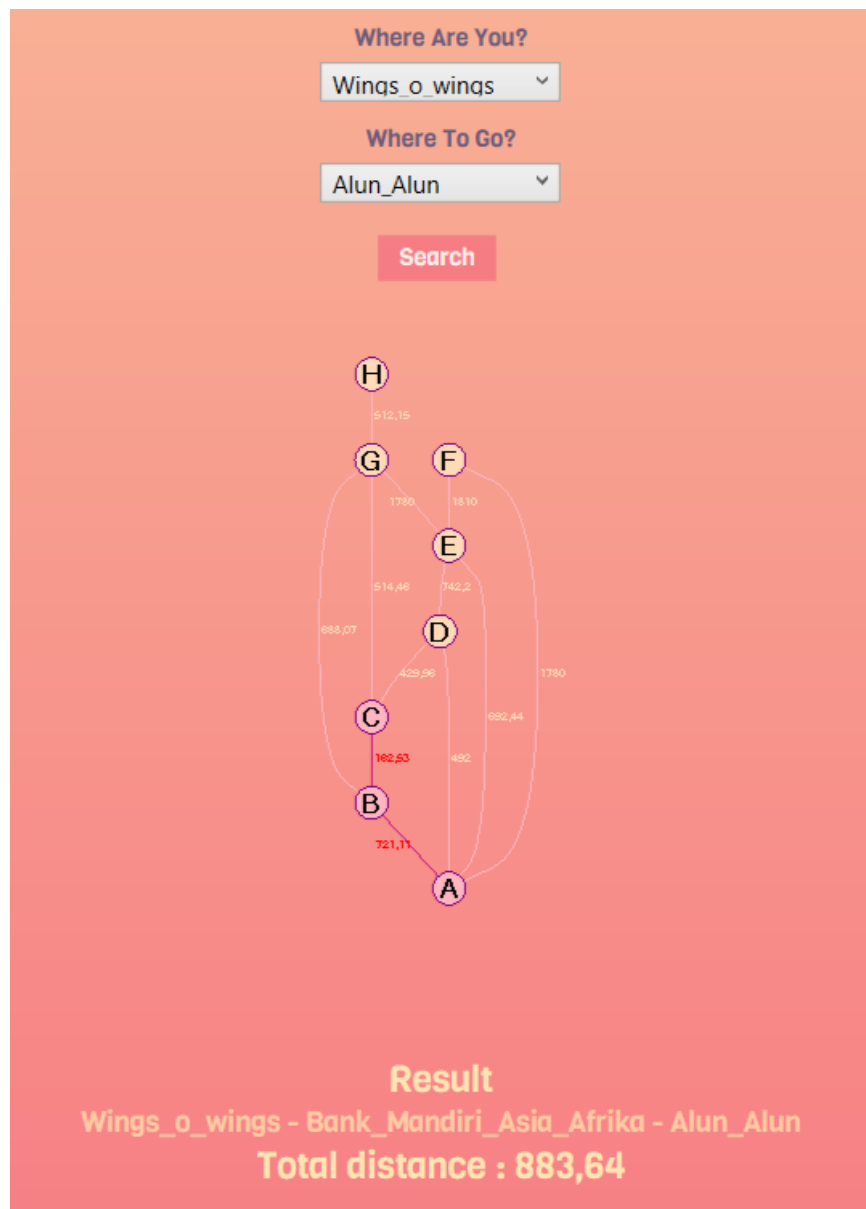


Gambar 3.6 - Google Map Sabuga - Mcdonald Dago

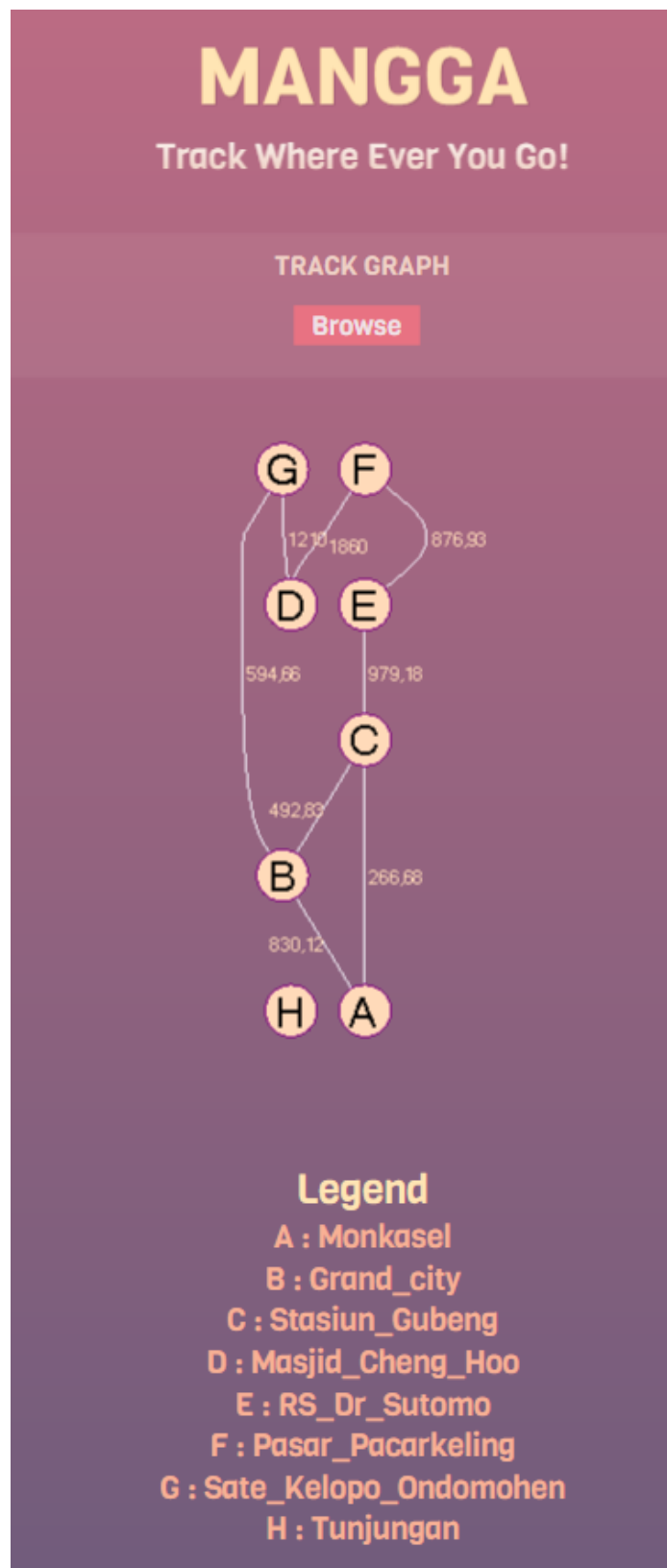
### 3.3. Daerah Alun-alun Bandung



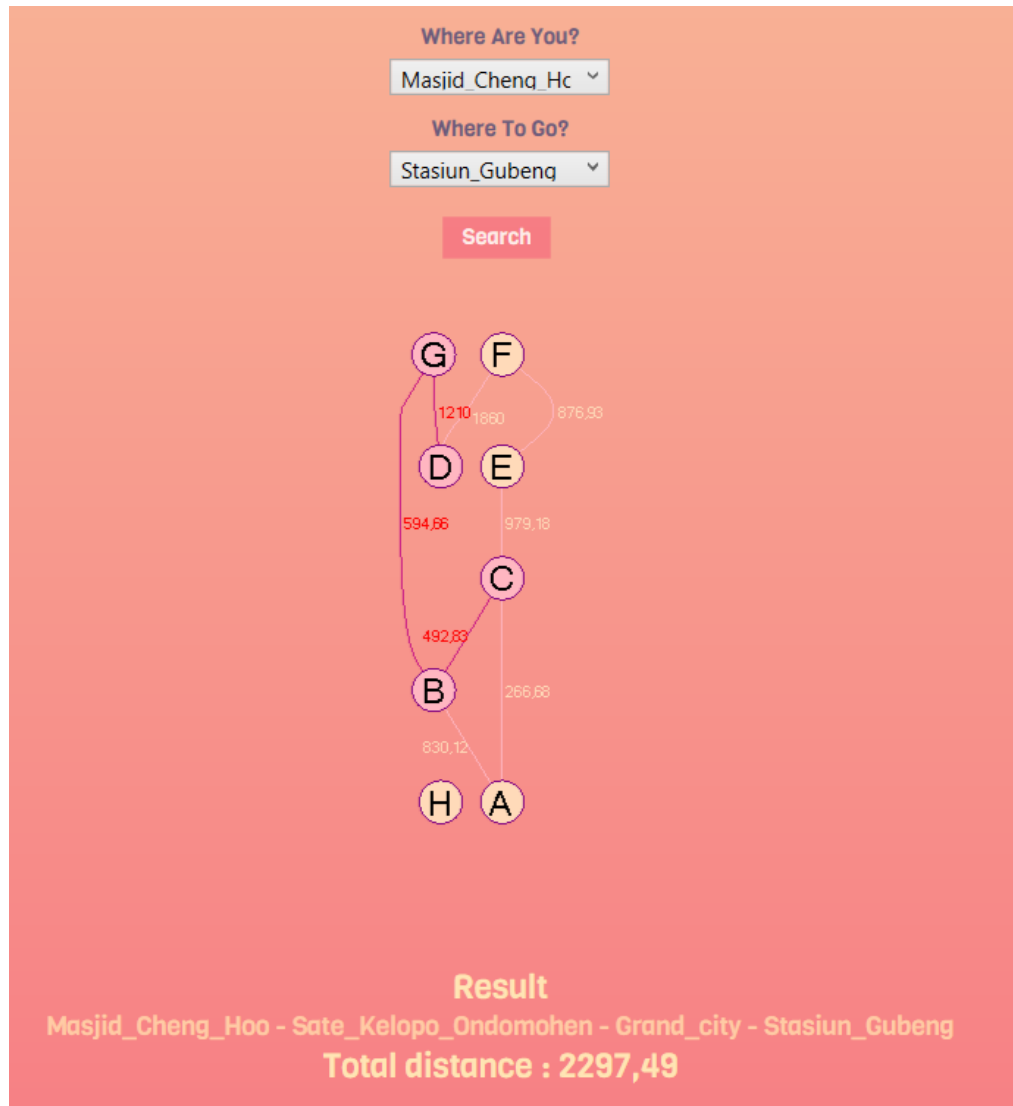
Gambar 3.7 - Graf Peta Alun-alun Bandung



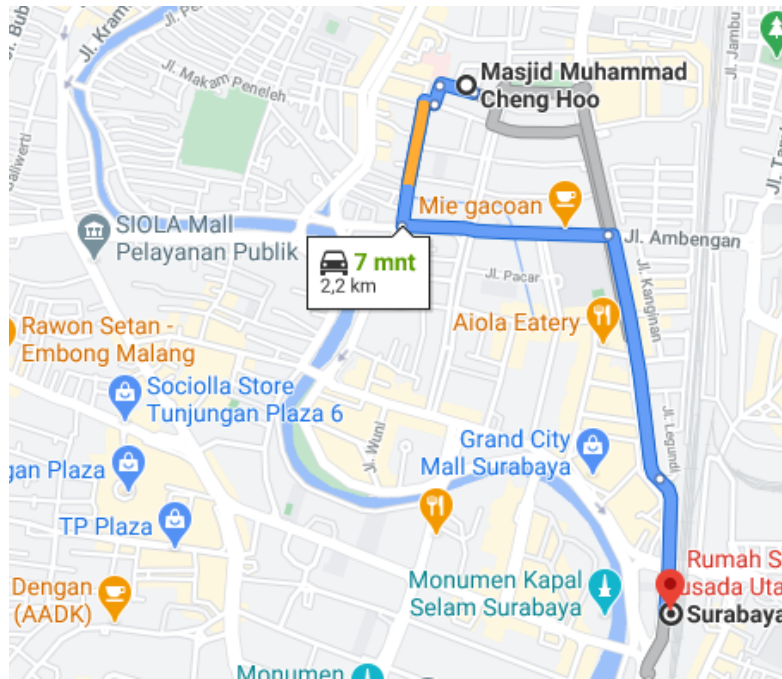
### 3.4. Daerah Pusat Kota Surabaya



Gambar 3.10 - Graf Peta Pusat Kota Surabaya



Gambar 3.11 - Masjid Cheng Hoo - Stasiun Gubeng



*Gambar 3.12 - Google Map Masjid Cheng Hoo - Stasiun Gubeng*

#### 4. Link Repository

[Repository Tugas Kecil 3](#)