## Case 1:

| Obejcts - Parameters | Mass (kg) | Friction | Gravity (m/s^2) | Default Pos |
|---|---|---|---|---|
| M1, 1 | 10 | 0.25 | 10 | (10,10) |
| M2, 2 | 2.5 | 0.25 | 10 | (5,10) |
| M3, 3 | 5 | 0.25 | 10 | (10,5) |

| n - Parameters | Force | Time at Force Change |
|---|---|---|
| 0 | 10 | 0 |
| 1 | - | - |
| 2 | - | - |

| Times to Calculate - Results | Object 1 Position | Object 2 Position | Object 3 Position | |
|---|---|---|---|---|
| 0.5 | (9.946428571428571,10.0) | (5.337053571428571,10.0) | (9.946428571428571,4.609375) | |
| 2 | (9.142857142857142,10.0) | (9.142857142857142,10.0) | (9.142857142857142,0.0) | at 2s object 3 hit the ground and x2 reached to x1 |
| 10 | (-11.428571428571427,10.0) | (-11.428571428571427,10.0) | (-11.428571428571427,0.0) | |

## Case 2:

| Obejcts - Parameters | Mass (kg) | Friction | Gravity (m/s^2) | Default Pos |
|---|---|---|---|---|
| M1, 1 | 5 | 0.25 | 10 | (5,5) |
| M2, 2 | 2 | 0.25 | 10 | (2,5) |
| M3, 3 | 3 | 0.1 | 10 | (5,3) |

| n - Parameters | Force | Time at Force Change |
|---|---|---|
| 0 | 5 | 0 |
| 1 | -10 | 5 |
| 2 | - | - |

| Times to Calculate - Results | Object 1 Position | Object 2 Position | Object 3 Position | |
|---|---|---|---|---|
| 2.5 | (3.828125,5.0) | (3.828125,5.0) | (3.828125,0.0) | the object goes to left |
| 7.5 | (23.75,5.0) | (26.75,5.0) | (23.75,0.0) | from 5 it started going right |
| - | - | - | - | |

## Case 3:

Now lets try M2>M3 and it should not move | Then lets change the force amount in the 1st second to +300N and see in time: 3s

Also lets take -300N to see how fast it goes to right in 1 sec | *with max friction

| Obejcts - Parameters | Mass (kg) | Friction | Gravity (m/s^2) | Default Pos |
|---|---|---|---|---|
| M1, 1 | 10 | 0.5 | 10 | (5,5) |
| M2, 2 | 5 | 0.5 | 10 | (2,5) |
| M3, 3 | 2.5 | 0.5 | 10 | (5,3) |

| n - Parameters | Force | Time at Force Change |
|---|---|---|
| 0 | -300 | 0 |
| 1 | 300 | 1 |
| 2 | - | - |

| Times to Calculate - Results | Object 1 Position | Object 2 Position | Object 3 Position | |
|---|---|---|---|---|
| 0.5 | (11.071428571428571,10.0) | (6.071428571428571,10.0) | (11.071428571428571,5.0) | M2 and M3 didn't move |
| 1 | (10.0,10.0) | (5.0,10.0) | (10.0,5.0) | returned to default postion |
| 2 | (1.4285714285714288,10.0) | (-3.571428571428571,10.0) | (1.4285714285714288,5.0) | |

## Case 4:

The program can take infinite number of Force Change, as well as times to calculate.

Ok now this is the updated version so I will try new input here.

Lets try for T1, T2, ... Tn put Increasing Fn changes | Force 10N increase every 1 second

| Obejcts - Parameters | Mass (kg) | Friction | Gravity (m/s^2) | Default Pos |
|---|---|---|---|---|
| M1, 1 | 5 | 0.2 | 10 | (10,10) |
| M2, 2 | 2 | 0.2 | 10 | (0,10) |
| M3, 3 | 3 | 0.2 | 10 | (10,0) |

| n - Parameters | Force | Time at Force Change |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 10 | 1 |
| 2 | 20 | 2 |
| 3 | 30 | 3 |
| 4 | 40 | 4 |
| 5 | 50 | 5 |

| Times to Calculate - Results | Object 1 Position | Object 2 Position | Object 3 Position | |
|---|---|---|---|---|
| 0 | (10,10) | (0,10) | (10,0) | |
| 1 | (9.2,10.0) | (2.0571428571428574,10.0) | (9.2,-1.4285714285714286) | |
| 2 | (-1.7763568394002505E-15,10.0) | (2.857142857142856,10.0) | (-1.7763568394002505E-15,-5.714285714285714) | You can see how the displacement |
| 3 | (-36.0,10.0) | (-18.857142857142854,10.0) | (-36.0,-10.0) | keeps decreasing faster and faster |
| 4 | (-130.8,10.0) | (-103.65714285714286,10.0) | (-130.8,-10.0) | |
| 5 | (-333.2,10.0) | (-296.0571428571428,10.0) | (-333.2,-10.0) | |

The program also records the initial velocities of object 1, let's check it out for this inputs. | Let's see on chart how the speed increases.

| Time - Initial Velocity | Object 1 | Rounding Numbers |
|---|---|---|
| 0 | 0.0m/s | 0 |
| 1 | 0.0m/s | 0 |
| 2 | 0.8m/s | 0.8 |
| 3 | 3.2000000000000006m/s | 3.2 |
| 4 | 8.0m/s | 8 |
| 5 | 16.0m/s | 16 |

The program is also able to print the accelartion but it is not written as code in printer.

Since I have submitted my file on Saturday and it is not neccesery to print accelartion,

I will not retouch it and leave it as it is.


Velocity as Time Increases

The Velocity keeps increasing more and more as time passes.

It may be possible to get the velocity from this chart at a current time

## Case 5:

On case 3, the force was 300N but the the displacement was not so fast

So lets try again and try to calculate velocities as well

by tricking the program that the forces cange but instead it remains the same

also lets see for more times.

| n - Parameters | Force | Time at Force Change |
|---|---|---|
| 0 | 300 | 0 |
| 1 | 300 | 1 |
| 2 | 300 | 2 |
| 3 | 300 | 3 |
| 4 | 300 | 4 |
| 5 | 300 | 5 |

| Obejcts - Parameters | Mass (kg) | Friction | Gravity (m/s^2) | Default Pos |
|---|---|---|---|---|
| M1, 1 | 5 | 0.5 | 10 | (10,10) |
| M2, 2 | 5 | 0.5 | 10 | (0,10) |
| M3, 3 | 5 | 0.5 | 10 | (10,0) |

| Times to Calculate - Results | Object 1 Position | Object 2 Position | Object 3 Position | |
|---|---|---|---|---|
| 0 | (10,10) | (0,10) | (10,0) | |
| 1 | (-10.0,10.0) | (-20.0,10.0) | (-10.0,0.0) | |
| 2 | (-100.0,10.0) | (-110.0,10.0) | (-100.0,0.0) | |
| 3 | (-320.0,10.0) | (-330.0,10.0) | (-320.0,0.0) | Wow, now it increases really fast |
| 4 | (-745.0,10.0) | (-755.0,10.0) | (-745.0,0.0) | when we run on longer times |
| 5 | (-1465.0,10.0) | (-1475.0,10.0) | (-1465.0,0.0) | |

now let's see the velocity chart and numbers

| Time - Initial Velocity | Object 1 | Rounding Numbers |
|---|---|---|
| 0 | 0.0m/s | 0 |
| 1 | 5.0m/s | 5 |
| 2 | 15.0m/s | 15 |
| 3 | 30.0m/s | 30 |
| 4 | 50.0m/s | 50 |
| 5 | 75.0m/s | 75 |


Velocity as Time Increases: Case 5

Now if you see it is more like a straight line