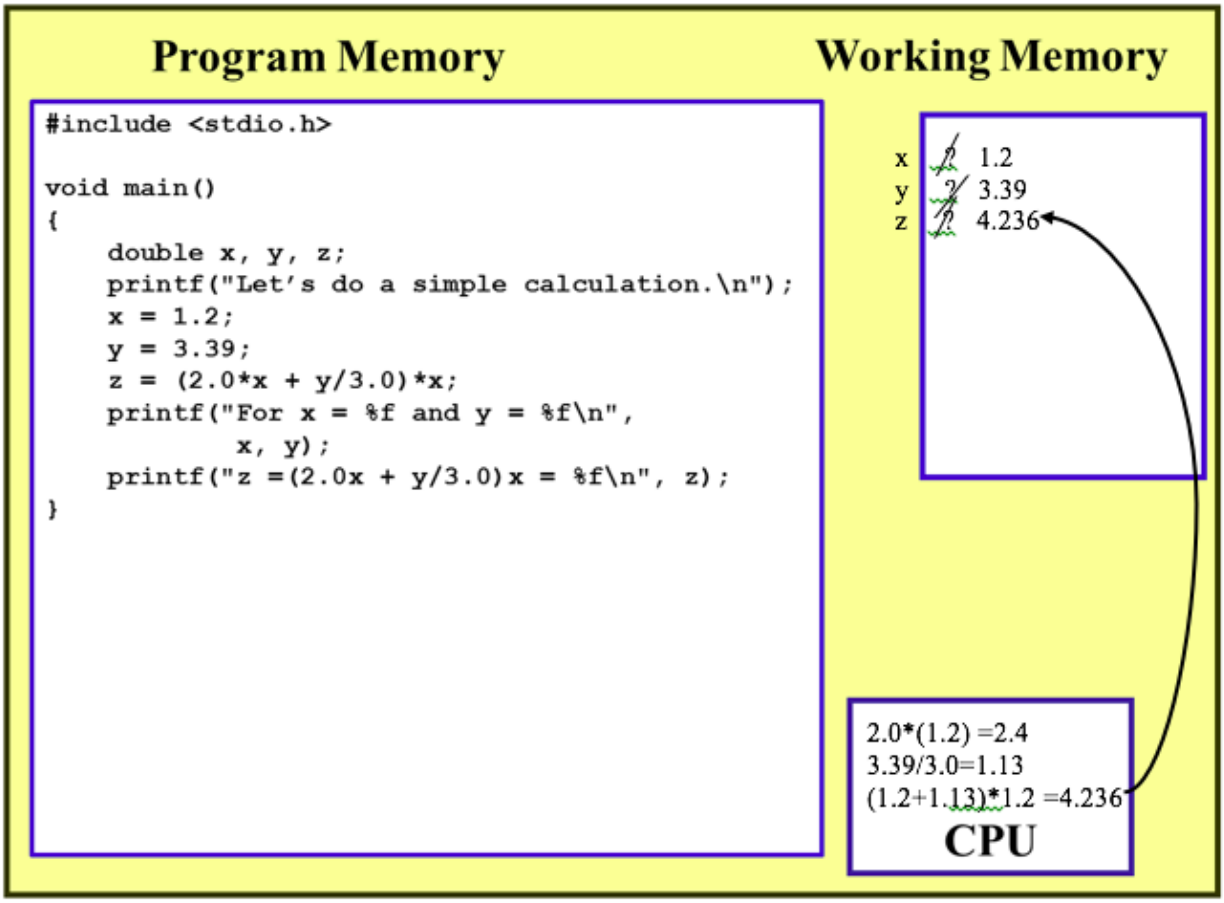
GNG 1106
Fundamentals of Engineering Computation

Assignment 1 – Fall 2016
Report

Dhrumil Naik 8641222

Question 1a:


Program Memory
Working Memory
#include <stdio.h>
void main()
{
double x, y, z;
printf("Let's do a simple calculation.\n");
x = 1.2;
y = 3.39;
z = (2.0*x + y/3.0)*x;
printf("For x = %f and y = %f\n",
x, y);
printf("z =(2.0x + y/3.0)x = %f\n", z);
}
x 1.2
y 3.39
z 4.236
2.0*(1.2) =2.4
3.39/3.0=1.13
(1.2+1.13)*1.2 =4.236
CPU

Question 1b:

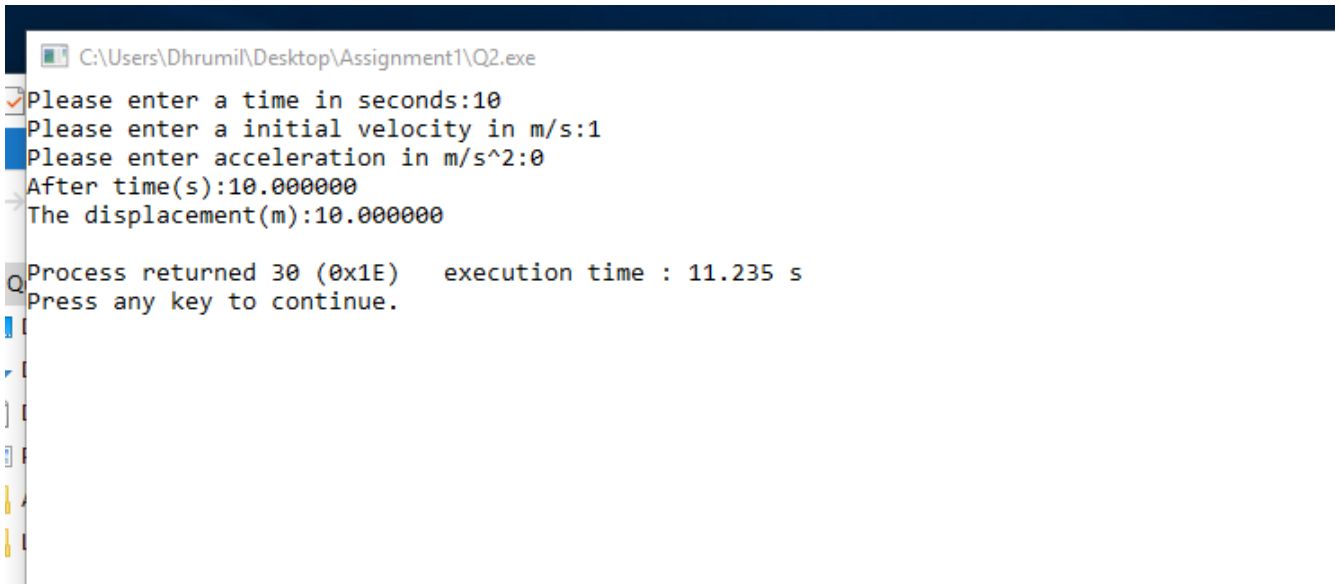
Question 2:

Source Code:

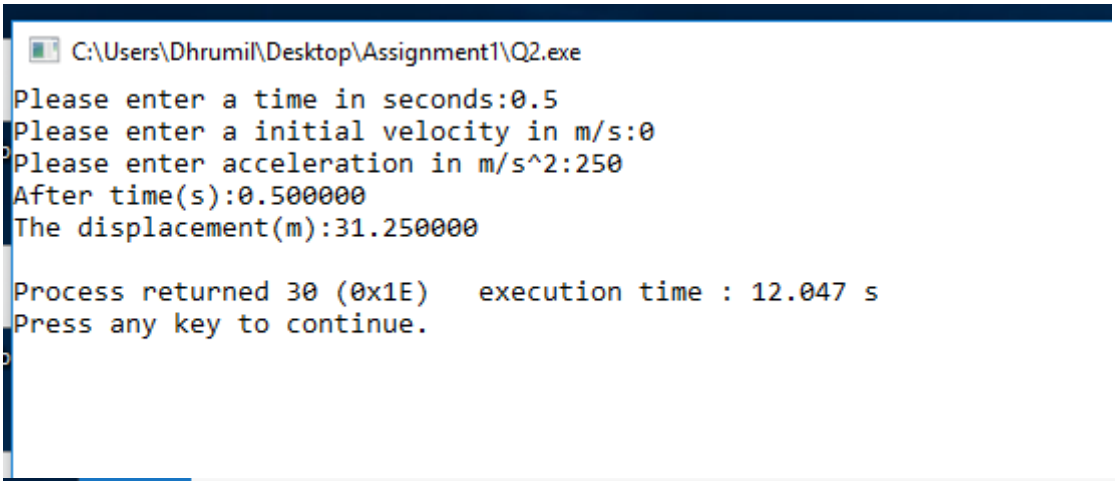
```
/*-------------------------------------------------------------
File: Displacement Calculation.c
Author: Dhrumil Naik
Description: Calculates Displacement
-------------------------------------------------------------*/
#include <stdio.h>
double calculateDistance(double, double, double);

void main(void)
{
   double t, v0, a, x;
   printf("Please enter a time in seconds:");
   scanf("%lf", &t);
   printf("Please enter a initial velocity in m/s:");
   scanf("%lf", &v0);
   printf("Please enter acceleration in m/s^2:");
   scanf("%lf", &a);
   x = calculateDistance(t,v0,a);
   printf("After time(s):%f\n", t);
   printf("The displacement(m):%f\n", x);
}
/*-------------------------------------------------------------
Function: calculateDistance
Parameters: t, v0, a
Return:  The value of the displacement (x)
Description: The function receives the value of the time, velocity and acceleration
-------------------------------------------------------------*/
double calculateDistance(double t, double v0, double a)
{
   double x;
   x=(v0*t)+ (0.5*a*t*t);
   return(x);

}
```

Outputs:

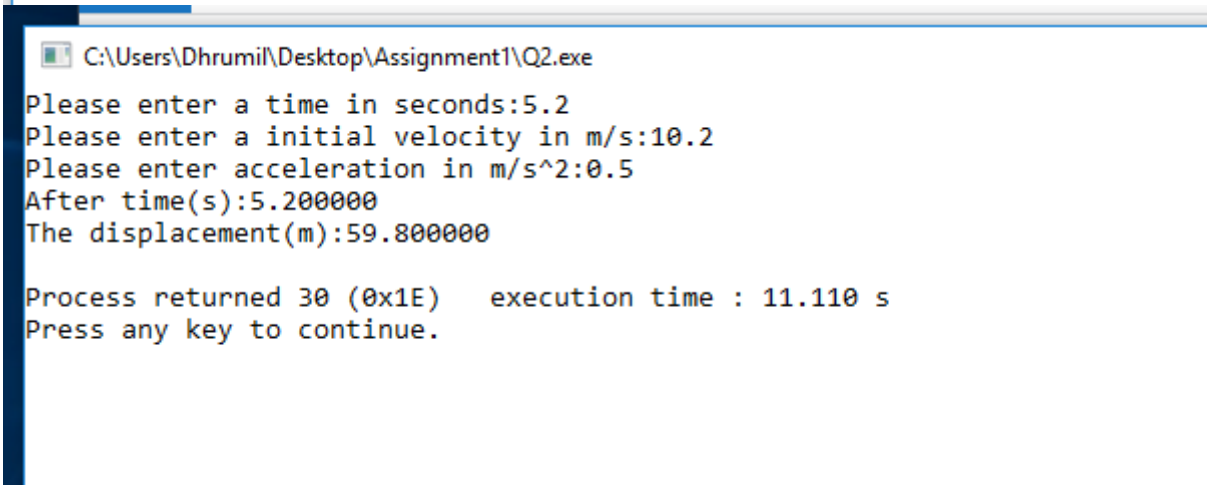
Test 1



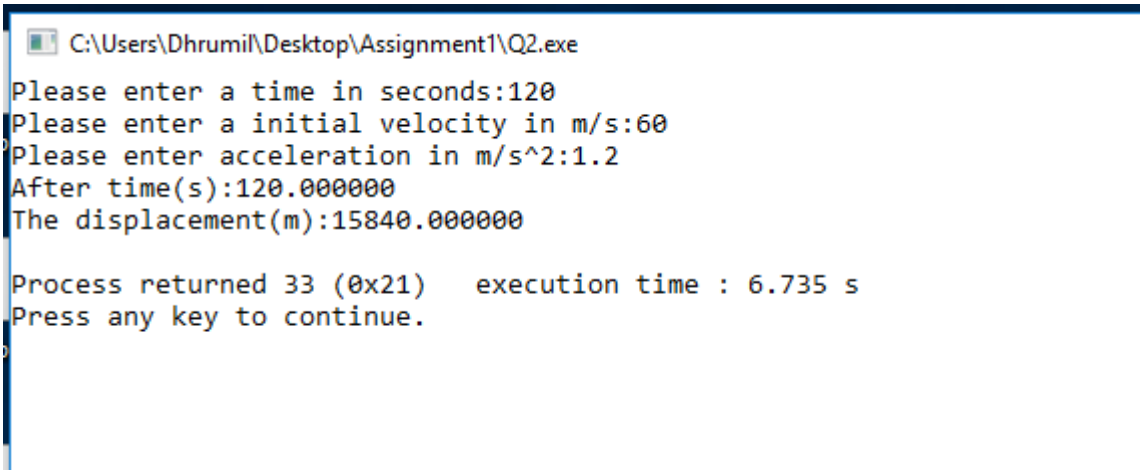
Test 2



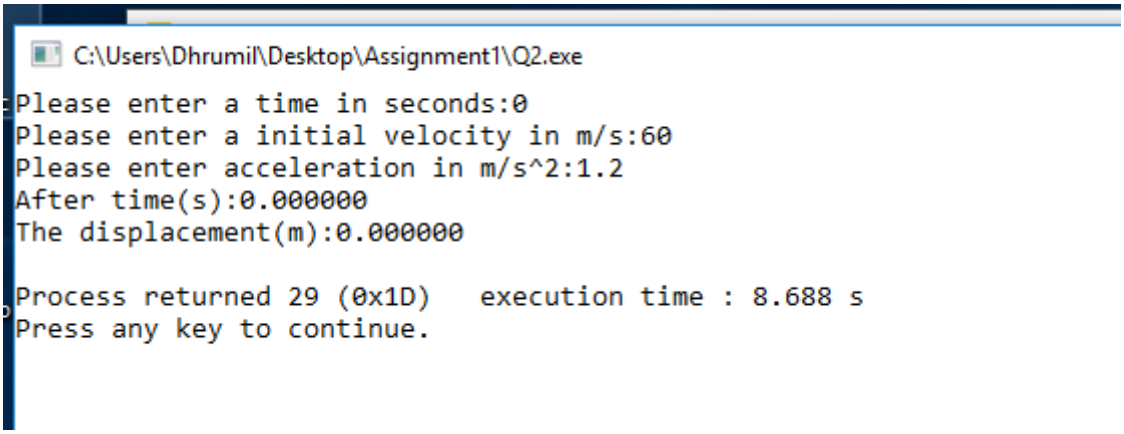
Test 3



Test 4


C:\Users\Dhrumil\Desktop\Assignment1\Q2.exe
Please enter a time in seconds:120
Please enter a initial velocity in m/s:60
Please enter acceleration in m/s^2:1.2
After time(s):120.000000
The displacement(m):15840.000000
Process returned 33 (0x21)   execution time : 6.735 s
Press any key to continue.

Test 5


C:\Users\Dhrumil\Desktop\Assignment1\Q2.exe
Please enter a time in seconds:0
Please enter a initial velocity in m/s:60
Please enter acceleration in m/s^2:1.2
After time(s):0.000000
The displacement(m):0.000000
Process returned 29 (0x1D)   execution time : 8.688 s
Press any key to continue.

Question 3

Table of Test Cases:

Gas	Molecular Weight (kg/kmole)	Boiling Point (degrees Celsius)	Mass (kg)	Temperature (degrees Celcius)	Gas Pressure (kPa)	R (kPa m^3)	Volume (m^3)
Argon	39.948	-185.8	0.4	-150	101.325	8.314	0.101180
Benzene	78.114	80.4	0.02	85.2	101.325	8.314	0.007528
Hydrogen	2.016	-253	3.1	-102	101.325	8.314	21.594417
Nitrogen	28.0134	-196	0.8	-52	101.325	8.314	0.518208
R-114 (refrigerant)	170.93	3.59	1.2	7	101.325	8.314	0.161379

Source Code:

```
/*-------------------------------------------------------------
File: The Ideal Gas Law.c
Author: Dhrumil Naik
Description: Calculates The Volume of a Gas
-------------------------------------------------------------*/
#include <stdio.h>
double calculatevolume(double, double, double);

void main (void)
{
   double mass, weight, temp, V;
   printf("Please enter the mass of the gas in kg: ");
   scanf("%lf", &mass);
   printf("Please enter the molecular weight of the gas in kg/kmole: ");
   scanf("%lf", &weight);
   printf("Please enter the temperature in degrees Celsius: ");
   scanf("%lf", &temp);
   V = calculatevolume(mass, weight, temp);
   printf("The volume in cubic meters is: %f ", V);

}
/*-------------------------------------------------------------
Function: calculatevolume
Parameters: mass, weight, temp
Return:  The value of the volume (x)
Description: The function receives the value of the mass, weight and temperature
```

```
----------------------------------------------------------------------*/

double calculatevolume(double mass, double weight, double temp)
{
   double V;
   V=(mass/weight)*8.314*(temp+273.15)/101.325;
   return(V);
}
```

Outputs

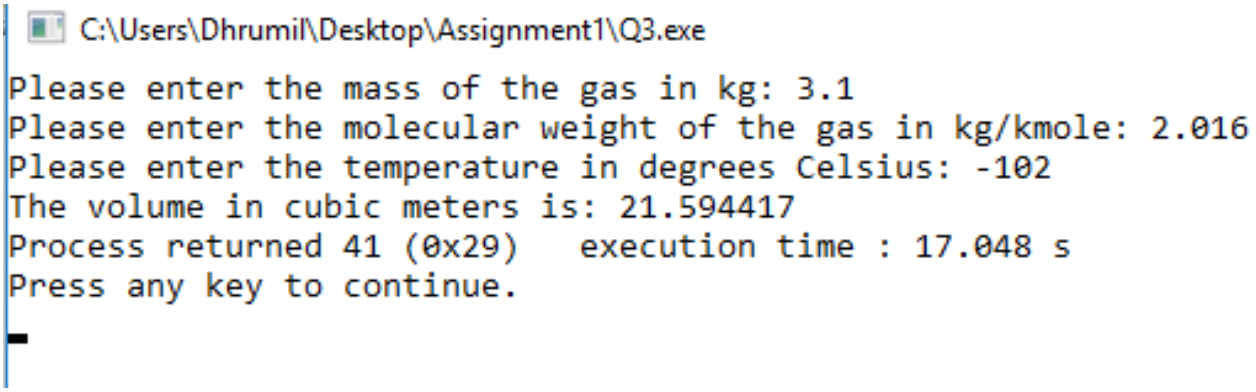
Test 1

```
C:\Users\Dhrumil\Desktop\Assignment1\Q3.exe
Please enter the mass of the gas in kg: 0.4
Please enter the molecular weight of the gas in kg/kmole: 39.948
Please enter the temperature in degrees Celsius: -150
The volume in cubic meters is: 0.101180
Process returned 40 (0x28)   execution time : 73.610 s
Press any key to continue.
```

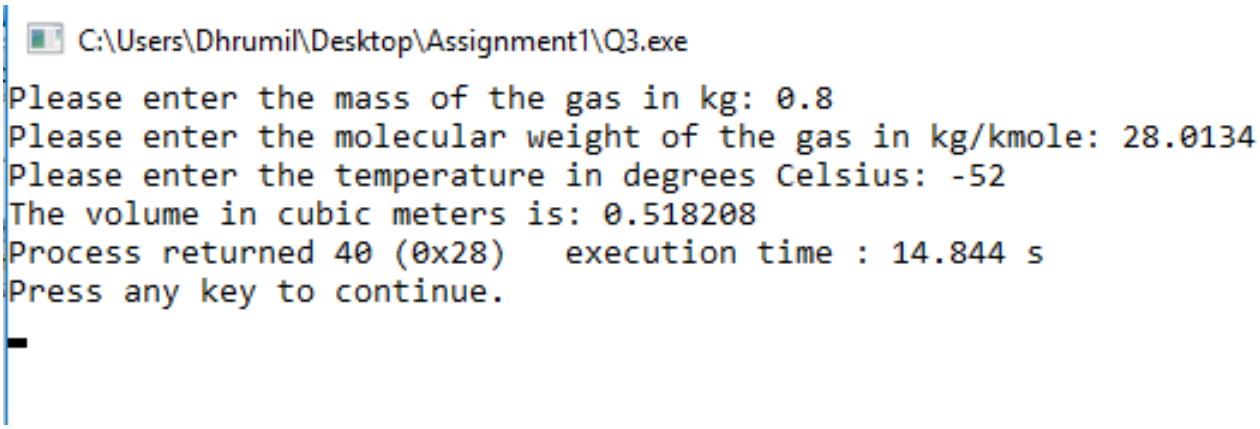
Test 2

```
C:\Users\Dhrumil\Desktop\Assignment1\Q3.exe
Please enter the mass of the gas in kg: 0.02
Please enter the molecular weight of the gas in kg/kmole: 78.114
Please enter the temperature in degrees Celsius: 85.2
The volume in cubic meters is: 0.007528
Process returned 40 (0x28)   execution time : 36.610 s
Press any key to continue.
```

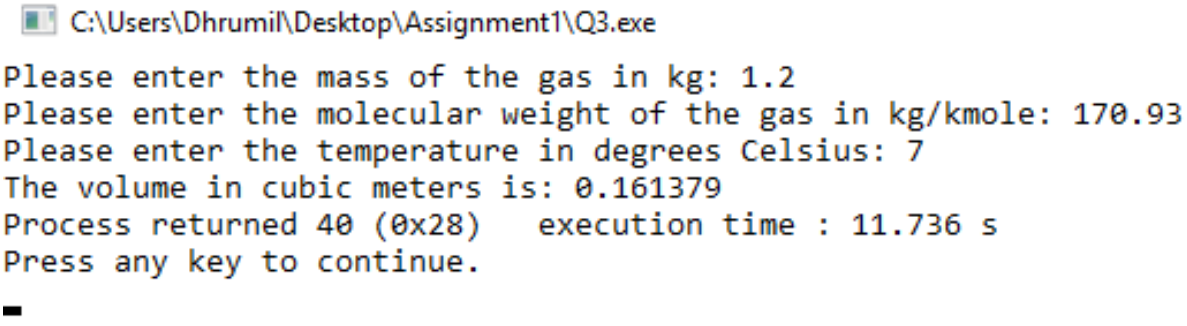
Test 3


C:\Users\Dhrumil\Desktop\Assignment1\Q3.exe
Please enter the mass of the gas in kg: 3.1
Please enter the molecular weight of the gas in kg/kmole: 2.016
Please enter the temperature in degrees Celsius: -102
The volume in cubic meters is: 21.594417
Process returned 41 (0x29)   execution time : 17.048 s
Press any key to continue.

Test 4


C:\Users\Dhrumil\Desktop\Assignment1\Q3.exe
Please enter the mass of the gas in kg: 0.8
Please enter the molecular weight of the gas in kg/kmole: 28.0134
Please enter the temperature in degrees Celsius: -52
The volume in cubic meters is: 0.518208
Process returned 40 (0x28)   execution time : 14.844 s
Press any key to continue.

Test 5


C:\Users\Dhrumil\Desktop\Assignment1\Q3.exe
Please enter the mass of the gas in kg: 1.2
Please enter the molecular weight of the gas in kg/kmole: 170.93
Please enter the temperature in degrees Celsius: 7
The volume in cubic meters is: 0.161379
Process returned 40 (0x28)   execution time : 11.736 s
Press any key to continue.