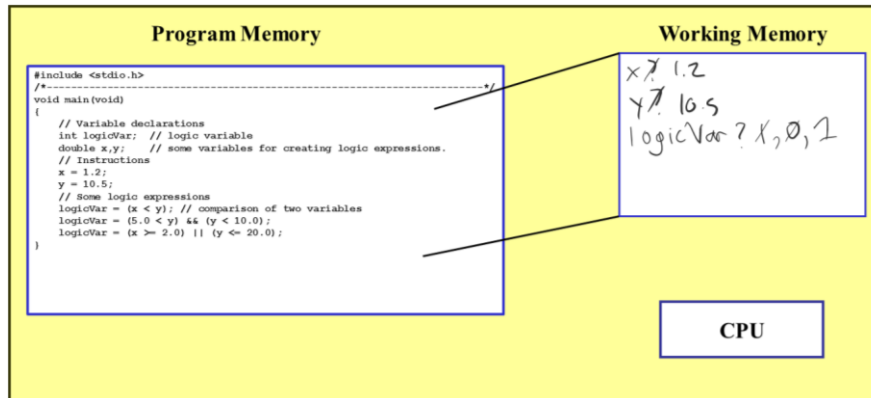
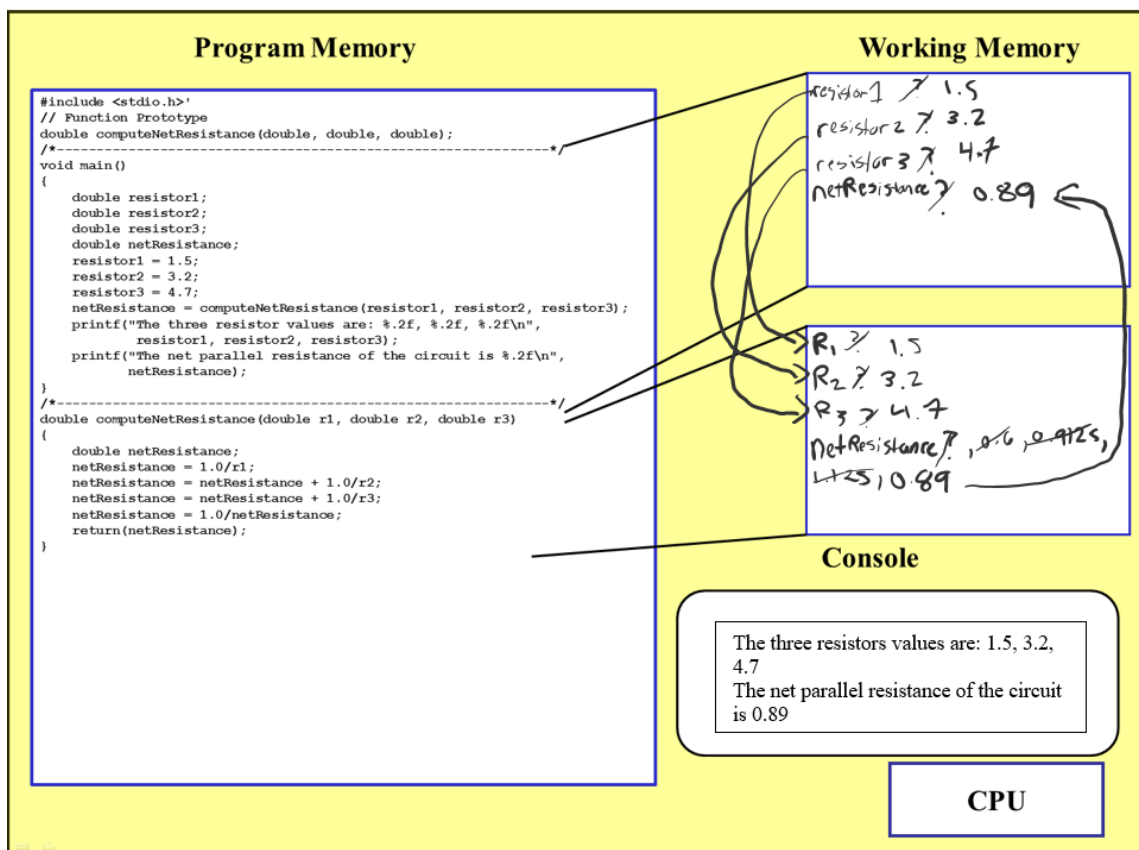


1.  
a)



- b)



2. /\*-----

File: assignment2.0.c

Author: Aunonto Bhuiya

Description: This program was made to calculate the minimum and maximum angle needed for the missile

to reach the desired altitude of the user.

-----\*/

#include <stdio.h>

#include <math.h>

#define R 6371

#define VE 11.2

// function prototypes

double angle (double i , double alt);

/\*-----

Function: main

Description: acquire user input, call angle, find min(anglA) and max (anglB)

print results

-----\*/

int main()

{

double lvelocity, altitude, anglA,anglB;// variable declaration

printf("\n please enter an initial velocity of the missile(in km/s:");//instructions

scanf("%lf", &lvelocity);

printf("\n please enter the desired altitude(in km:");

scanf("%lf", &altitude);

anglA= angle(lvelocity, altitude\*0.98);

anglB= angle(lvelocity, altitude\*1.02);

```
printf("For initial velocity %.3f km/s and desired altitude %.3f km. The departure angle must be  
between %.3f and %.3f",lvelocity, altitude, anglA,anglB );
```

```
return 0;  
}  
/*-----
```

Function:convertVolume

Parameters:

i- initial velocity

alt - desired altitude of user

Return: Returns the angle (angl) that was calculated from user input

Description: The function is made to calculate the exact angle

need by using i, alt with constants R, VE

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

```
double angle(double i, double alt)
```

```
{
```

```
double angl, alp;
```

```
alp = alt/R;
```

```
angl = pow(VE/i,2);
```

```
angl = (alp/(1+alp)*angl);
```

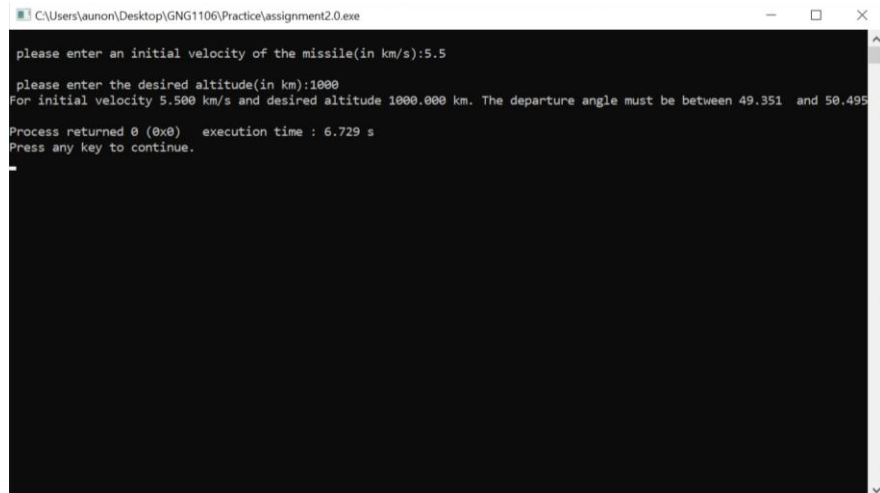
```
angl = sqrt(1-angl);
```

```
angl = asin((1+alp)*angl);
```

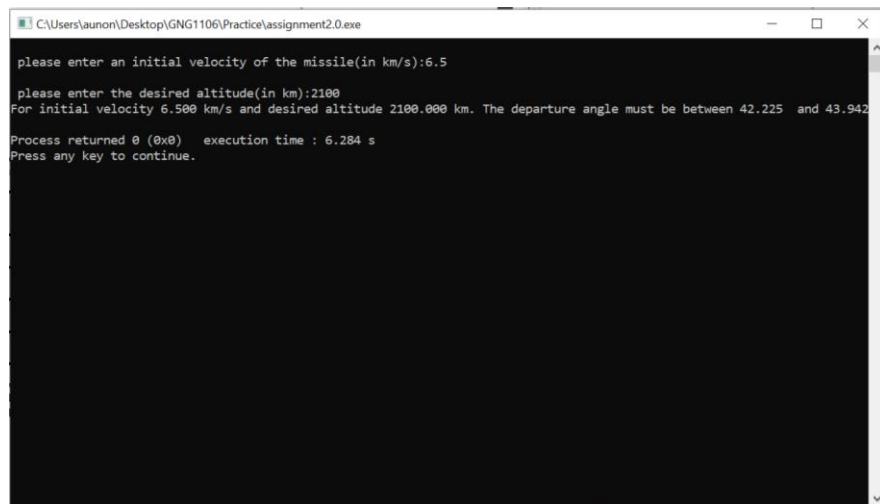
```
angl = angl * (180/M_PI);
```

```
return(angl);  
}
```

## Output



```
C:\Users\anon\Desktop\GNG1106\Practice\assignment2.0.exe  
please enter an initial velocity of the missile(in km/s):5.5  
please enter the desired altitude(in km):1000  
For initial velocity 5.500 km/s and desired altitude 1000.000 km. The departure angle must be between 49.351 and 50.495  
Process returned 0 (0x0) execution time : 6.729 s  
Press any key to continue.  
_
```



```
C:\Users\anon\Desktop\GNG1106\Practice\assignment2.0.exe  
please enter an initial velocity of the missile(in km/s):6.5  
please enter the desired altitude(in km):2100  
For initial velocity 6.500 km/s and desired altitude 2100.000 km. The departure angle must be between 42.225 and 43.942  
Process returned 0 (0x0) execution time : 6.284 s  
Press any key to continue.  
_
```

```
C:\Users\anun\Desktop\GNG1106\Practice\assignment2.0.exe

please enter an initial velocity of the missile(in km/s):7.5
please enter the desired altitude(in km):3800
For initial velocity 7.500 km/s and desired altitude 3800.000 km. The departure angle must be between 39.510 and 41.858
Process returned 0 (0x0)   execution time : 12.339 s
Press any key to continue.
```

```
C:\Users\anun\Desktop\GNG1106\Practice\assignment2.0.exe

please enter an initial velocity of the missile(in km/s):8.4
please enter the desired altitude(in km):5200
For initial velocity 8.400 km/s and desired altitude 5200.000 km. The departure angle must be between 53.485 and 55.558
Process returned 0 (0x0)   execution time : 8.662 s
Press any key to continue.
```