

# GNG1106 Winter 2019 - Assignment 1

**Available: Jan 13**

**Due: Jan 27, 11:59pm**

## Instructions

This assignment is to be done INDIVIDUALLY. Use the following instructions to complete and submit this assignment:

- You will need to submit your assignment electronically to Brightspace. Prepare the following:
  - An assignment file in PDF format (this allows you to use your favorite editor to create the PDF file). For question 1, insert the programming models for parts (a) and (b) filled in as per the question instructions. You may fill in the programming model using drawing features of your editor or by hand on paper which is then scanned and inserted into your document (be sure that the hand drawn diagram is legible). For Questions 2 and 3, insert in your assignment file the source code (take care in its appearance), and capture the output from running the program for all test cases. Also submit your **source code** files for questions 2 and 3.
- Place all your files (PDF file and C source code files) in a directory A1\_xxxxxxx where xxxxxxx is your student number.
- Zip your PDF document and the C source files in a zip file with the name A1\_xxxxx.zip where xxxxxx is your student number.
- Submit the zip file before the assignment deadline via Brightspace. In Brightspace, navigate to the Assignment page and click on “Click to submit Assignment 1” to reach the assignment 1 submission folder. You can also select the Assignment tab to see the Assignment folder pages. The Brightspace video “Assignments” (found in the page [https://documentation.brightspace.com/EN/le/assignments/learner/submit\\_assignments.htm](https://documentation.brightspace.com/EN/le/assignments/learner/submit_assignments.htm) ) provides details to help you submit the zip file.
- The questions are provided in both PDF and Word files. You may use the Word file to enter your answers in the document. An rtf file is also provided so that you may edit the file with a word processor other than Word. Be sure to submit a **PDF** file.
- It is NOT permitted to use instructions such as branches and loops that have not yet been covered in the lectures.
- Do start the assignment soon and do not wait until the last minute. You will be more efficient with a number of smaller efforts over a few weeks before the deadline than one large effort just before the deadline.

## Marking Scheme (total 20 marks)

- Question 1: 10 marks
- Question 2: 10 marks
- Question 3: 15 marks

Question 1 (10 marks)

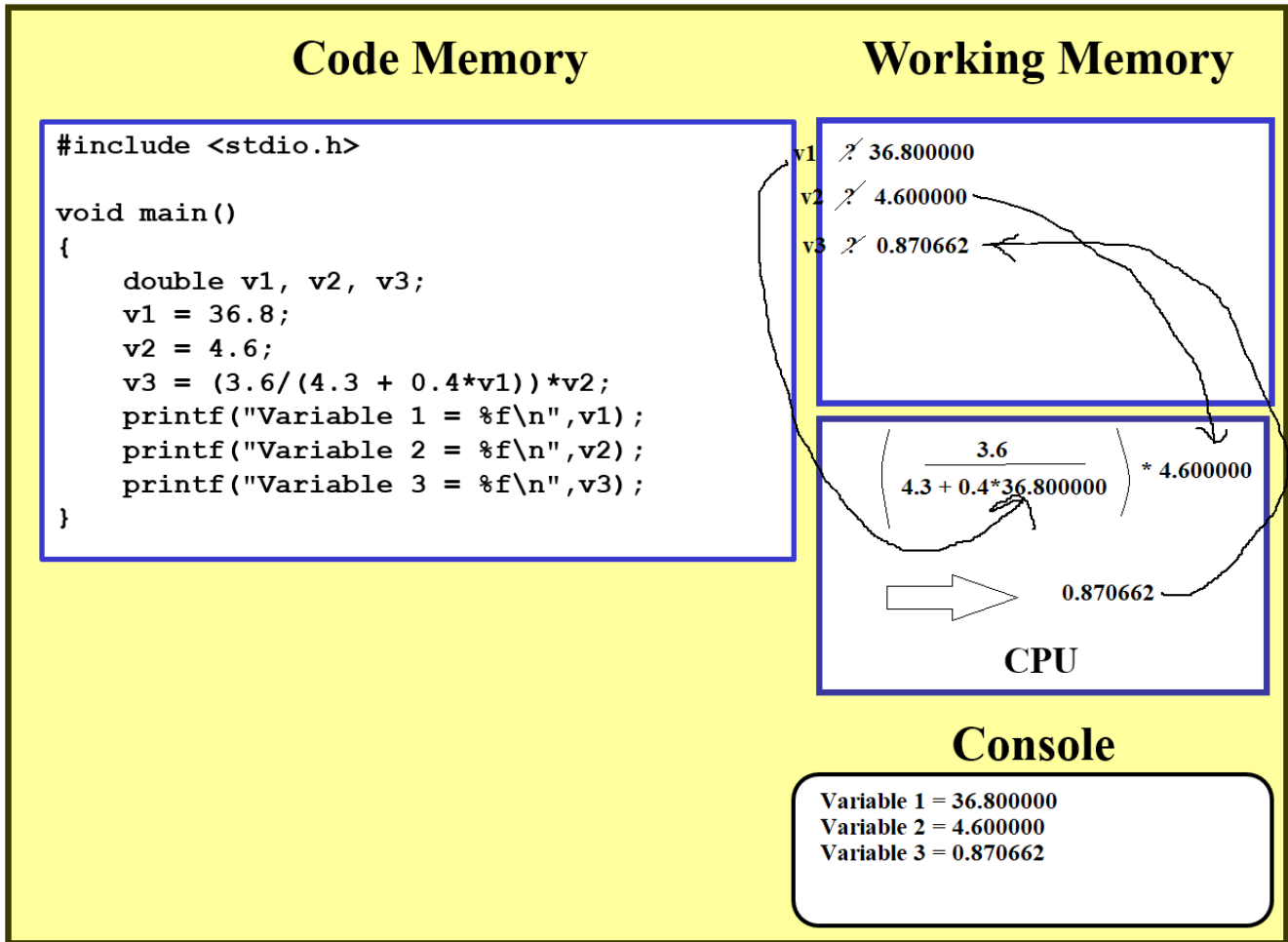
1. (5 marks) The following programming model contains the indicated C program in its code memory. You will be showing how the working memory is used during the execution of this program and how the CPU evaluates the arithmetic expression that assigns a value to the variable **u**.

Show the variables created in the working memory and how their values change during the execution of the program.

- Show the values are assigned to the variables. Be sure to show all values that are assigned and replaced. Record successive assignments to variables/parameters as follows:

Variable nam  $\lambda, \lambda, \lambda, \lambda, 10$

- For the operation, show how contents from the working memory are moved to the CPU to calculate the value assigned to variable u. Show the results of **all** operations carried out in the CPU, that is, **one line** per operation.
- Finally show the output of the program in the console window.



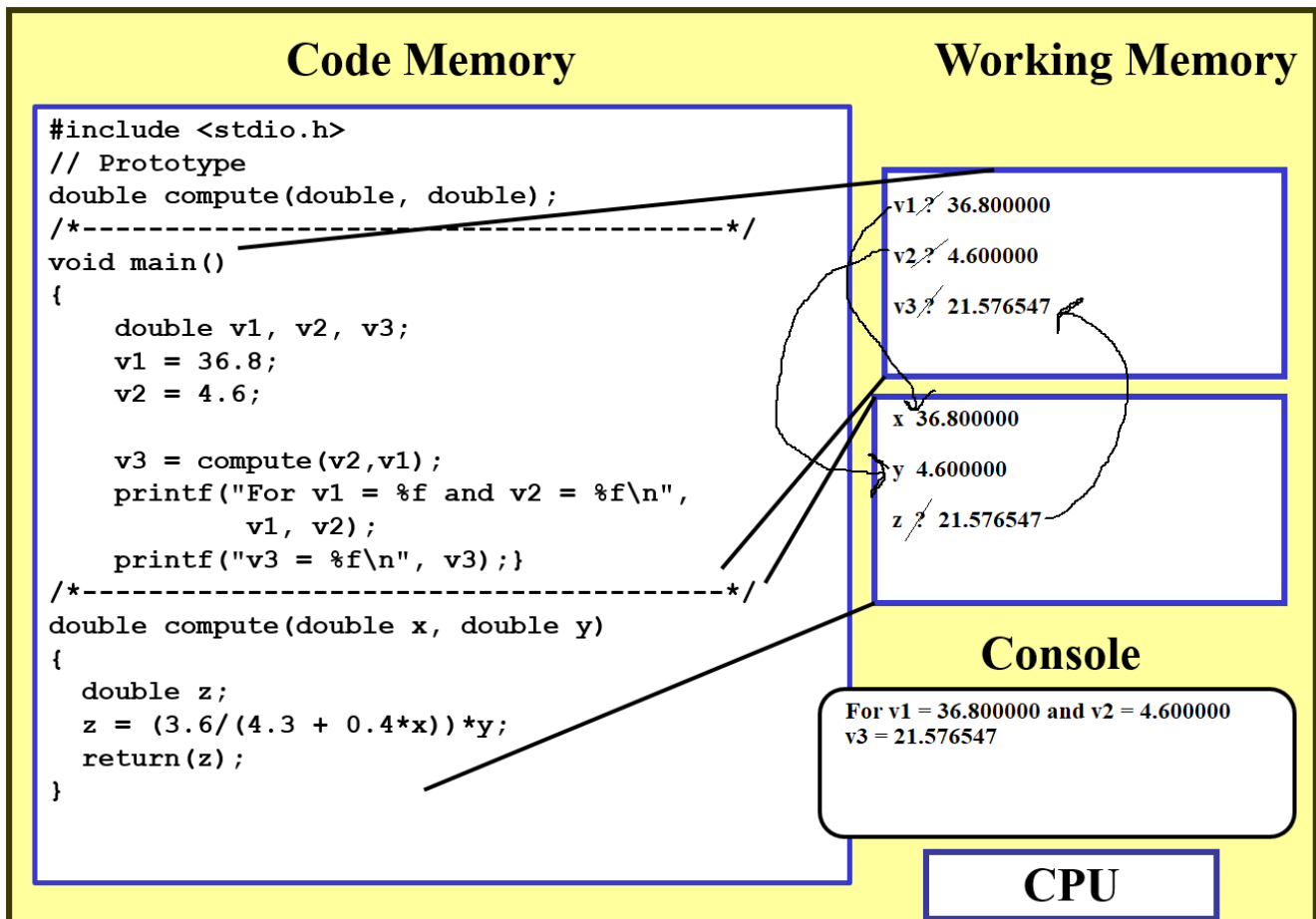
2. (5 marks) The following programming model contains in its code memory the indicated C program composed of 2 functions. You will be showing how the working memory is used during the execution of the two functions. Each piece of working memory is associated to a function using a pair of lines. (Note: the first pair of lines associates the piece of working memory allocated to the function **main** and the second pair of lines associates the piece allocated to the function **compute**).

Show how the variables (and parameters) are created in each piece of working memory during the execution of the program. It is **not** necessary to show how the operations are carried out in the CPU as in the case of part (a).

- Show the values are assigned to the variables. Be sure to show all values that are assigned and replaced. Record successive assignments to variables/parameters as follows:

**Variable name? \ 2, 6, 4, 10**

- Using arrows show how values are copied between the working memory allocated to the function **main** and the working memory allocated to the function **compute**.
- Finally show the output of the program in the console window.



## Question 2 (10 marks)

You are involved in the development of an aircraft engine, the propfan or open rotor engine (see <https://en.wikipedia.org/wiki/Propfan> ). A plane with mass 20 000 kg reaches a speed of 180 m/s where the engine applies a force of 40 000 newtons. When the pilot increases the engine's power to 60 000 newtons and the plane accelerates, the following equation gives the change in speed after the increase in power (a new speed is reached after about 120 s).

$$v = 0.00001t^3 - 0.00488t^2 + 0.75795t + 181.3566$$

where  $v$  is the plane's speed in m/s and  $t$  is the time in seconds ( $t = 0$  when the engine's power is increased to 60 000 newtons).

Develop a program that computes the speed of the plane at a given time  $t$ . The user will provide the value of the time. Test your program with the following test cases:

Time $t$ (s)	Speed $v$ (m/s)
0.00	181.3566 0
2.00	182.8530 6
10.00	188.4581 0
50.00	208.3041 0
100.00	218.3516 0
120.00	219.3186 0

### Guidelines:

#### Logic/Strategies

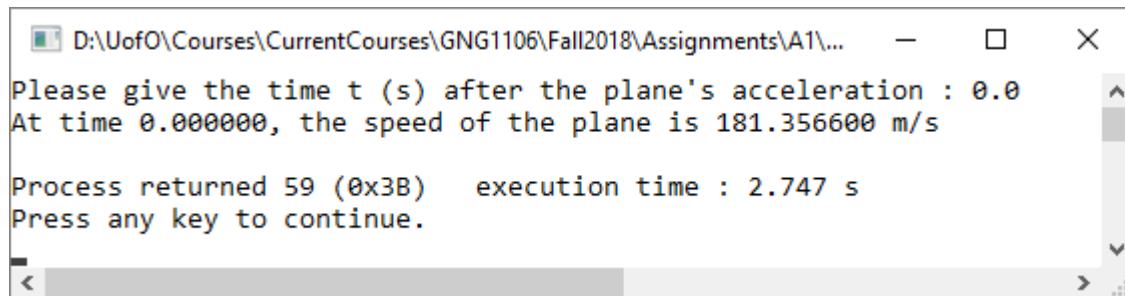
- In the **main** function
  - Consider using the following local variables.
    - **v**: for the speed of the plane,
    - **t**: for the time  $t$ ,
  - Prompt the user for the time  $t$ . Use short and appropriate prompt messages. Read the values from the keyboard and assign them respectively to the variable  $t$ .
  - Call a function, say **calculateSpeed**, to calculate the speed of the plane. Store the result returned by the function in the variable **v**. You will need to define this function in your program.
  - Display the results with a message of the following form:  
At time 0.0, the speed of the plane is 181.3566 m/s
- For the function **calculateSpeed**
  - Consider using the following parameters
    - **t**: for the value of time,
  - Consider using the following local variables
    - **speed**: for storing the speed of the plane at time  $t$  (note that this variable will contain the value returned).

- The function calculates speed of the plane (see the equation given at the beginning of the question), stores it in the variable **speed** and returns the value stored in **speed**.

Test the program using the values provided in the table above. In your assignment file, give the output of your program for all test cases.

The answer to this question should provide:

- 1) The source code to your program (also insert the source code into the assignment file).
- 2) The output showing the results of all the test cases; insert the output into the assignment file. The following is an example of the output for the first test case.



```
D:\UofO\Courses\CurrentCourses\GNG1106\Fall2018\Assignments\A1\...
Please give the time t (s) after the plane's acceleration : 0.0
At time 0.000000, the speed of the plane is 181.356600 m/s

Process returned 59 (0x3B)   execution time : 2.747 s
Press any key to continue.
```

•

Question 3 (15 marks)

The electrical resistance of a material depends on temperature. The resistance temperature coefficient,  $\alpha$ , allows adjustment of the resistance of a material for a given temperature. In addition to the coefficient, the resistance of the material must be known at a standard temperature (normally 20 degrees Celsius). The resistance,  $R$ , of a material at a temperature  $T$  can be found using

$$R = R_{ref} [1 + \alpha(T - T_{ref})]$$

11\\* MERGEFORMAT ()

where

$R$  is the material's resistance in ohms at the temperature  $T$  in °C.

$R_{ref}$  is the material's resistance at the reference temperature  $T_{ref}$  (normally at 20 °C)

$\alpha$  is the resistance temperature coefficient (°C) of the material

$T$  is the material's temperature in °C

$T_{ref}$  is the reference temperature (°C) at which  $\alpha$  is defined for the material.

(reference: <https://www.allaboutcircuits.com/textbook/direct-current/chpt-12/temperature-coefficient-resistance/> )

For metals, the coefficient is positive, which indicates that resistance increases as temperature increases. In the case of the elements carbon, germanium, and silicone, the coefficient is negative, which indicates that the resistance decreases as temperature increases. For certain metal alloys, the coefficient is almost zero and thus their resistance varies very little with change in temperature. The following table provides examples for the resistance temperature coefficient.

Material	Element/Alloy	$\alpha$ (°C)
Nickel	Element	0.005866
Iron	Element	0.005671
Tungsten	Element	0.004403
Aluminium	Element	0.004308
Copper	Element	0.004041
Steel (99.5% iron, 0.5% carbon)	<b>Alloy</b>	0.003
Constantan	<b>Alloy</b>	-0.000074
Silicon	Element	-0.075
Germanium	Element	-0.048

You are involved in a project for the development of electrical transformers which contains field coils. Field coils consist of a conductor wrapped around an iron core. Your role is to develop software which can calculate the conductor resistance of the coils at different temperatures.

The resistance of a coil is computed with the following steps

- Using the resistance value per unit length,  $R_L$  (ohms/meter) and the length of the conductor,  $L$

$$R_{ref} = R_L L$$

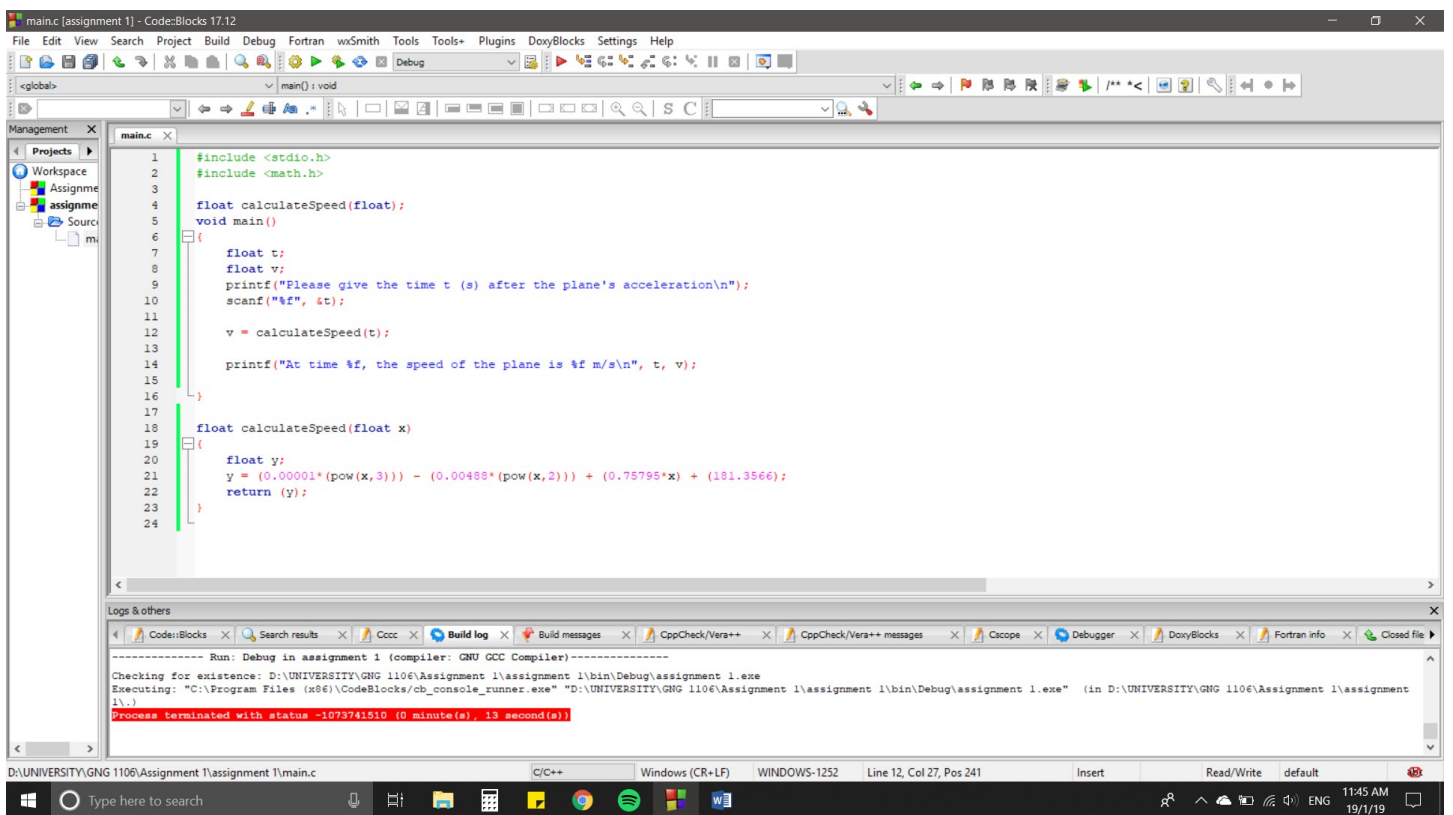
(meters), compute the coil resistance at the reference temperature,  $T_{ref}$ , (20 °C) as

- To adjust the resistance at the given temperature,  $T$  (°C), equation 1 is used with a given resistance temperature coefficient,  $\alpha$  (°C), at the reference temperature,  $T_{ref}$  (20 °C).

Apply the following guidelines to answer this question:

- First develop a set of test cases (Excel is practical spreadsheet software that allows you to create test cases). Provide at least 5 test cases. Ensure that the test cases cover a wide range of values:
  - Vary the resistance per unit length,  $R_L$ , between 0.00327 ohms/m and 3.55 ohms/m
  - Use the coefficient values for aluminum and copper given in the above table.

- c) Vary the length of the conductor between 0.1 meters and 100 meters.
- 2) Develop your program using the GNG1106 C template (GNG1106template.c), that is, your program will contain a `main` function and a function that calculates the resistance of the field coil conductor. The `main` function contains instructions to get data from the user, calls the function to compute the resistance, and displays the results to the user. Be sure to document well your program and follow programming conventions.
- 3) A hint: The value  $5.65 \times 10^{-8}$  is represented in a C program with `5.65e-8`.
- 4) Include in your assignment report, a table of your test cases, your source code, and the captures output for all your test cases. Also submit your source code file.





The image shows a Code::Blocks IDE window titled "main.c [assignment 1] - Code::Blocks 17.12". The main editor displays the following C++ code:

```
1 #include <stdio.h>
2 #include <math.h>
3
4 float calculateSpeed(float);
5 void main()
6 {
7     float t;
8     float v;
9     printf("Please give the time t (s) after the plane's acceleration\n");
10    scanf("%f", &t);
11
12    v = calculateSpeed(t);
13
14    printf("At time %f, the speed of the plane is %f m/s\n", t, v);
15
16 }
17
18 float calculateSpeed(float x)
19 {
20     float y;
21     y = (0.00001*(pow(x,3)) - (0.00488*(pow(x,2))) + (0.75795*x) + (181.3566));
22     return (y);
23 }
24
```

An output window titled "D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1..." shows the program's execution:

```
Please give the time t (s) after the plane's acceleration
2
At time 2.000000, the speed of the plane is 182.853058 m/s

Process returned 59 (0x3B)   execution time : 7.081 s
Press any key to continue.
```

The "Logs & others" panel at the bottom shows the build and execution process:

```
----- Run: Debug in assignment 1 (compiler: GNU GCC Compiler)-----
Checking for existence: D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe
Executing: "C:\Program Files (x86)\CodeBlocks\cb_console_runner.exe" "D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe" (in D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\.)
```

The status bar at the bottom indicates the current position: "C/C++ Windows (CR+LF) WINDOWS-1252 Line 12, Col 27, Pos 241". The system tray shows the time as 11:43 AM on 19/1/19.

The screenshot displays the Code::Blocks IDE interface. The main editor window shows the following C++ code in `main.c`:

```
1 #include <stdio.h>
2 #include <math.h>
3
4 float calculateSpeed(float);
5 void main()
6 {
7     float t;
8     float v;
9     printf("Please give the time t (s) after the plane's acceleration\n");
10    scanf("%f", &t);
11
12    v = calculateSpeed(t);
13
14    printf("At time %f, the speed of the plane is %f m/s\n", t, v);
15
16 }
17
18 float calculateSpeed(float x)
19 {
20     float y;
21     y = (0.00001*pow(x,3)) - (0.00488*(pow(x,2))) + (0.75795*x) + (181.3566);
22     return (y);
23 }
24
```

The console window shows the program's execution output:

```
"D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe"
Please give the time t (s) after the plane's acceleration
10
At time 10.000000, the speed of the plane is 188.458099 m/s
Process returned 60 (0x3C)   execution time : 16.761 s
Press any key to continue.
```

The 'Logs & others' panel at the bottom shows the build and execution process:

```
----- Run: Debug in assignment 1 (compiler: GNU GCC Compiler)-----
Checking for existence: D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe
Executing: "C:\Program Files (x86)\CodeBlocks\cb_console_runner.exe" "D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe" (in D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\.)
```

The status bar at the bottom indicates the current position: C/C++ Windows (CR+LF) WINDOWS-1252 Line 12, Col 27, Pos 241. The system tray shows the time as 11:44 AM on 19/1/19.

main.c [assignment 1] - Code::Blocks 17.12

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help

<global> | main(): void

Management | main.c

```
1 #include <stdio.h>
2 #include <math.h>
3
4 float calculateSpeed(float);
5 void main()
6 {
7     float t;
8     float v;
9     printf("Please give the time t (s) after the plane's acceleration\n");
10    scanf("%f", &t);
11
12    v = calculateSpeed(t);
13
14    printf("At time %f, the speed of the plane is %f m/s\n", t, v);
15
16 }
17
18 float calculateSpeed(float x)
19 {
20     float y;
21     y = (0.00001*(pow(x,3)) - (0.00488*(pow(x,2))) + (0.75795*x) + (181.3566));
22     return (y);
23 }
24
```

"D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe"

```
Please give the time t (s) after the plane's acceleration
50
At time 50.000000, the speed of the plane is 208.304892 m/s

Process returned 60 (0x3C)   execution time : 6.796 s
Press any key to continue.
```

Logs & others

```
----- Run: Debug in assignment 1 (compiler: GNU GCC Compiler)-----
Checking for existence: D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe
Executing: "C:\Program Files (x86)\CodeBlocks\cb_console_runner.exe" "D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe" (in D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\.)
```

D:\UNIVERSITY\GNG 1106\Assignment 1\main.c C/C++ Windows (CR+LF) WINDOWS-1252 Line 12, Col 27, Pos 241 Insert Read/Write default 11:44 AM 19/1/19

The screenshot displays the Code::Blocks IDE interface. The main editor window shows the following C++ code:

```
1 #include <stdio.h>
2 #include <math.h>
3
4 float calculateSpeed(float);
5 void main()
6 {
7     float t;
8     float v;
9     printf("Please give the time t (s) after the plane's acceleration\n");
10    scanf("%f", &t);
11
12    v = calculateSpeed(t);
13
14    printf("At time %f, the speed of the plane is %f m/s\n", t, v);
15
16 }
17
18 float calculateSpeed(float x)
19 {
20     float y;
21     y = (0.00001*(pow(x,3)) - (0.00488*(pow(x,2))) + (0.75795*x) + (181.3566));
22     return (y);
23 }
24
```

The console window on the right shows the program's execution output:

```
"D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe"
Please give the time t (s) after the plane's acceleration
100
At time 100.000000, the speed of the plane is 218.351593 m/s

Process returned 61 (0x3D)   execution time : 27.353 s
Press any key to continue.
```

The 'Logs & others' window at the bottom shows the following log messages:

```
----- Run: Debug in assignment 1 (compiler: GNU GCC Compiler)-----
Checking for existence: D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe
Executing: "C:\Program Files (x86)\CodeBlocks\cb_console_runner.exe" "D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe" (in D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\.)
```

The status bar at the bottom indicates the current file is 'D:\UNIVERSITY\GNG 1106\Assignment 1\main.c', the language is 'C/C++', and the cursor is at 'Line 12, Col 27, Pos 241'.

The screenshot displays the CodeBlocks IDE interface. The main editor window shows the following C++ code in `main.c`:

```
1 #include <stdio.h>
2 #include <math.h>
3
4 float calculateSpeed(float);
5 void main()
6 {
7     float t;
8     float v;
9     printf("Please give the time t (s) after the plane's acceleration\n");
10    scanf("%f", &t);
11
12    v = calculateSpeed(t);
13
14    printf("At time %f, the speed of the plane is %f m/s\n", t, v);
15
16 }
17
18 float calculateSpeed(float x)
19 {
20     float y;
21     y = (0.00001*(pow(x,3)) - (0.00488*(pow(x,2))) + (0.75795*x) + (181.3566));
22     return (y);
23 }
24
```

The console window shows the program's execution output:

```
"D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\bin\Debug\assignment 1.exe"
Please give the time t (s) after the plane's acceleration
120
At time 120.000000, the speed of the plane is 219.318604 m/s
Process returned 61 (0x3D)   execution time : 7.073 s
Press any key to continue.
```

The status bar at the bottom indicates the current file is `D:\UNIVERSITY\GNG 1106\Assignment 1\assignment 1\main.c`, the language is `C/C++`, and the cursor is at `Line 12, Col 27, Pos 241`. The system tray shows the time as `11:45 AM 19/1/19`.

Question 3 Excel - Saved Harsh Bhasin

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Clipboard Font Alignment Number Styles Cells Editing

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
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Sheet1

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2:19 PM 19/1/19

"DAUNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"

Please enter Resistance per unit length:  
1  
Please enter the length of the wire:  
0.1  
Please enter temperature:  
25  
Please enter Resistance temperature coefficient  
0.004041  
The final resistance is 0.102021

Process returned 0 (0x0) execution time : 11.189 s  
Press any key to continue.

Question 3 Excel - Saved Harsh Bhasin

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General Conditional Formatting Insert

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Cell Styles Format

Clipboard Font Alignment Number Styles Cells Editing

D9

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
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Sheet1

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2:20 PM 19/1/19

"D:\UNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"

Please enter Resistance per unit length:  
1.5  
Please enter the length of the wire:  
5  
Please enter temperature:  
30  
Please enter Resistance temperature coefficient  
.004041  
The final resistance is 7.803075

Process returned 0 (0x0) execution time : 10.014 s  
Press any key to continue.

Question 3 Excel - Saved Harsh Bhasin

File Home Insert Page Layout Formulas Data Review View Help

Calibri 11

General Conditional Formatting Insert

Format as Table Delete

Cell Styles Format

Clipboard Font Alignment Number Styles Cells Editing

D9

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
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Sheet1

Ready

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2:20 PM 19/1/19

"DAUNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"

Please enter Resistance per unit length:  
2

Please enter the length of the wire:  
20

Please enter temperature:  
35

Please enter Resistance temperature coefficient  
0.004041

The final resistance is 42.424599

Process returned 0 (0x0) execution time : 11.635 s  
Press any key to continue.

Question 3 Excel - Saved Harsh Bhasin

File Home Insert Page Layout Formulas Data Review View Help

Calibri 11

General Conditional Formatting Insert

Format as Table Delete

Cell Styles Format

Clipboard Font Alignment Number Styles Cells Editing

A5 2.5

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
9									
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Sheet1

Ready

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2:20 PM 19/1/19

```
"D:\UNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"
Please enter Resistance per unit length:
2.5
Please enter the length of the wire:
50
Please enter temperature:
15
Please enter Resistance temperature coefficient
.004308
The final resistance is 122.307503
Process returned 0 (0x0) execution time : 14.166 s
Press any key to continue.
```

AutoSave Question 3 Excel - Saved Harsh Bhasin "DAUNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"

File Home Insert Page Layout Formulas Data Review View Help

Calibri 11 General Conditional Formatting Insert Paste B I U A A Font Alignment Number Styles Cells Editing

A6 3

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
9									
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Sheet1

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Process returned 0 (0x0) execution time : 12.216 s  
Press any key to continue.

Please enter Resistance per unit length:  
3  
Please enter the length of the wire:  
100  
Please enter temperature:  
10  
Please enter Resistance temperature coefficient  
.004308  
The final resistance is 287.075989

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Calibri 11

General Conditional Formatting Insert

Format as Table Delete

Cell Styles Format Editing

Clipboard Font Alignment Number Styles Cells Editing

A7 3.2

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
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Sheet1

Ready

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"D:\UNIVERSITY\GNG 1106\Assignment 1\1a1q3\bin\Debug\1a1q3.exe"
Please enter Resistance per unit length:
3.2
Please enter the length of the wire:
95
Please enter temperature:
50
Please enter Resistance temperature coefficient
.004308
The final resistance is 343.288971
Process returned 0 (0x0)   execution time : 12.199 s
Press any key to continue.
```

Question 3 Excel - Saved Harsh Bhasin

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Calibri 11 General Conditional Formatting Insert Sum

Font Alignment Number Styles Cells Editing

A7 3.2

	A	B	C	D	E	F	G	H	I
1	Resistance per unit length	Length	Temperature	Alpha	Resistance				
2	1	0.1	25	0.004041	0.102021				
3	1.5	5	30	0.004041	7.803075				
4	2	20	35	0.004041	42.4246				
5	2.5	50	15	0.004308	122.3075				
6	3	100	10	0.004308	287.076				
7	3.2	95	50	0.004308	343.289				
8	3.55	7.5	0	0.004041	24.47317				
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Sheet1

Ready

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```

Please enter Resistance per unit length:
3.55
Please enter the length of the wire:
7.5
Please enter temperature:
0
Please enter Resistance temperature coefficient
.004041
The final resistance is 24.473167
Process returned 0 (0x0) execution time : 10.630 s
Press any key to continue.

```

```
main.c [a1q3] - Code::Blocks 17.12
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global> main(void): int
Management
Projects Synt
Workspace
a1q3
Sources
main.c x
1 #include <stdio.h>
2
3
4 float CalcResFinal(float R, float L, float T, float A)
5 //CalcResFinal (float R, float L, float T, float A);
6 {
7     float Rfinal;
8     Rfinal = (R*L)*(1+(A*(T-20)));
9     return(Rfinal);
10 }
11
12 int main(void)
13 {
14     float RESul;
15     float length;
16     float Temp;
17     float alpha;
18     float FinalRes;
19
20     printf("Please enter Resistance per unit length:\n");
21     scanf("%f", &RESul);
22
23     printf("Please enter the length of the wire:\n");
24     scanf("%f", &length);
25
26     printf("Please enter temperature:\n");
27     scanf("%f", &Temp);
28
29     printf("Please enter Resistance temperature coefficient:\n");
30     scanf("%f", &alpha);
31
32     FinalRes = CalcResFinal (RESul, length, Temp, alpha);
33
34     printf("The final resistance is %f\n", FinalRes);
35     return 0;
36 }
37
D:\UNIVERSITY\GNG 1106\Assignment 1\1a1q3\main.c C/C++ Windows (CR+LF) WINDOWS-1252 Line 27, Col 14, Pos 559 Insert Read/Write default
Type here to search 2:16 PM 19/1/19
```