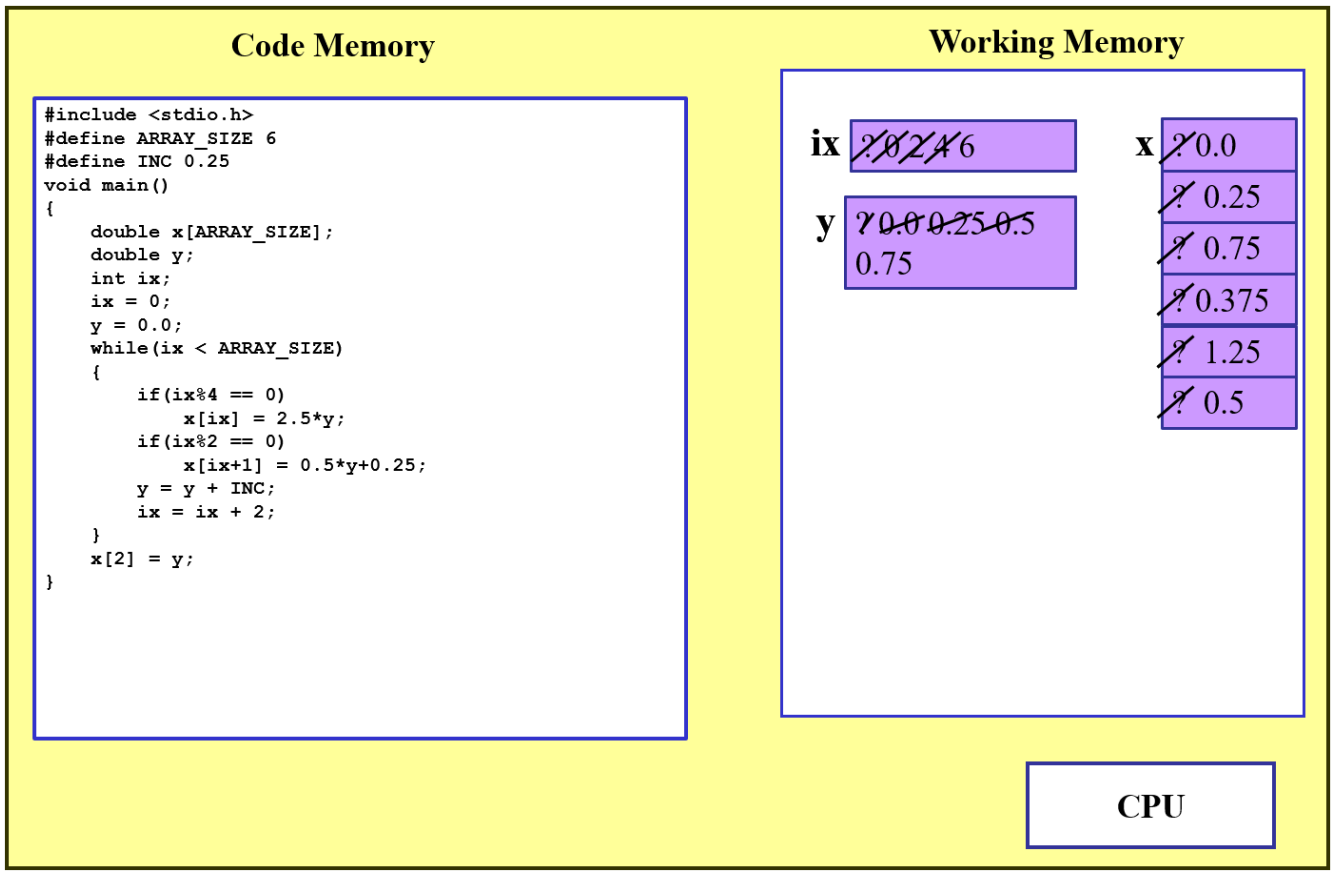
GNG1106 Fall 2017 - Assignment 5 Solution

Deduct 0 to 5 points for not submitting assignment according to instructions (in a zip file, directory, with source code, etc.)

Question 1 (5 marks)

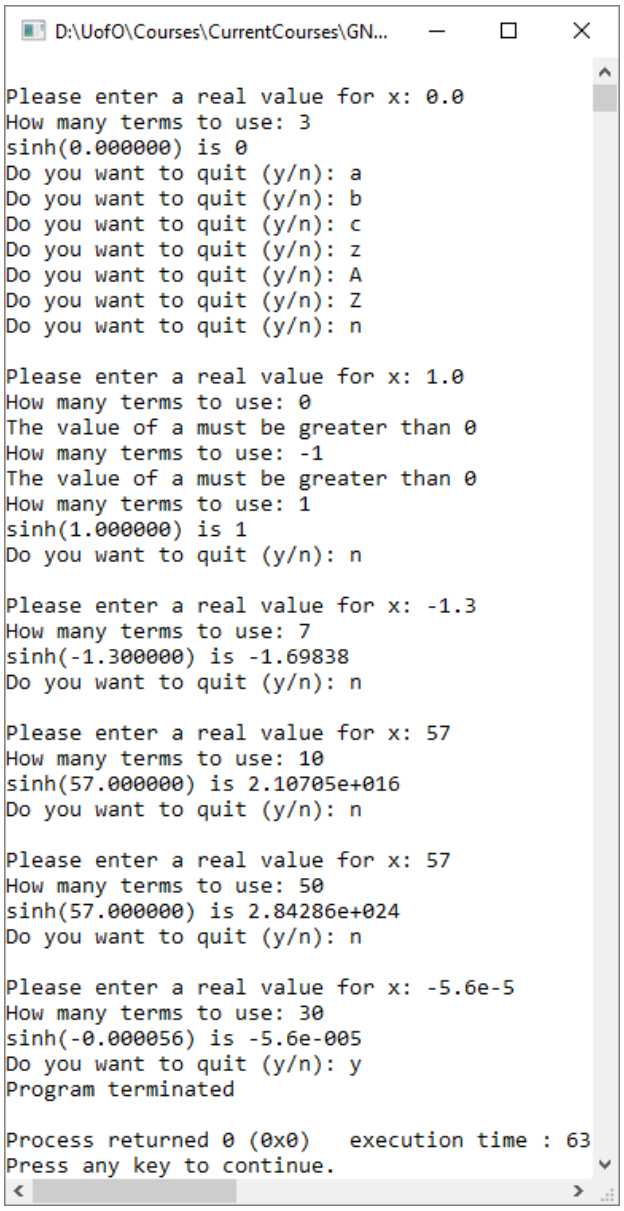


Marking Scheme:

Defining and initialization of the array and variables in memory	1 mark
0.5 for properly creating the array and variables in memory.	
0.5 for ? in all elements in array and in both variables	
Update of values in variables	2 marks
1 for ix (deduct 0.5 if value 6 is missing)	
1 for y (deduct 0.5 if 0.75 is missing)	
Update of values for array elements	2 marks
1/3 for each element	
Total	5 marks

Question 2 (10 marks)

Output



Marking Scheme:

Deduct 5 marks if array or structures used in the solution.

C Program

Main function (3 total marks))

Outer Do/while loop for computing sinh(x) values	0.75 mark
Instructions to compute sinh(x) and display results	0.75 mark
0.25 for each instruction (calls to getInput, sinHyper, printf)	
Inner Do/while loop for getting correct input answer (y or n)	0.75 mark
Instructions for getting answer	0.75 mark
0.25 for each instruction (calls to fflush, printf, scanf)	
Deduct 0.5 if while or for loops used instead of the do/while loops	

Function getInput (2.5 marks total)

Comments (header)	0.25 mark
Function header/prototype	0.25 mark
Instructions to get value for x	0.5 mark
Deduct 0.25 if xPtr not used in scanf argument	
Instructions to get value for n	0.5 mark
Deduct 0.25 if nPtr not used in scanf argument	
Loop to repeat request for value of n if less than/equal to zero	1 mark
Acceptable to use return to provide one of the values.	

Function sinh (3.5 marks total)

Comments (header)	0.25 mark
Function header/prototype	0.25 mark
Initialization of variables	0.25 mark
Initialization of i can be done in a for instruction	
Loop (including incrementing i)	1 mark
Term i as an integer shall be used to control loop, Deduct 0.25 if i declared as double, Deduct 0.25 if starting i at 0 and using if instruction to differentiate t_0 calculation from other t_i calculation. Can use a for loop.	
Initialization of term/sinh	0.5 mark
0.25 for each initialization of each variable	
Computation of value for term	0.5 mark
Computation of value for sinh	0.5 mark
Return statement	0.25 mark

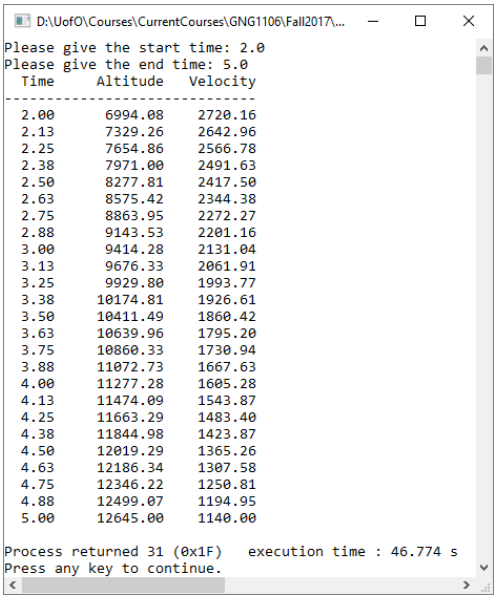
Output	1 mark

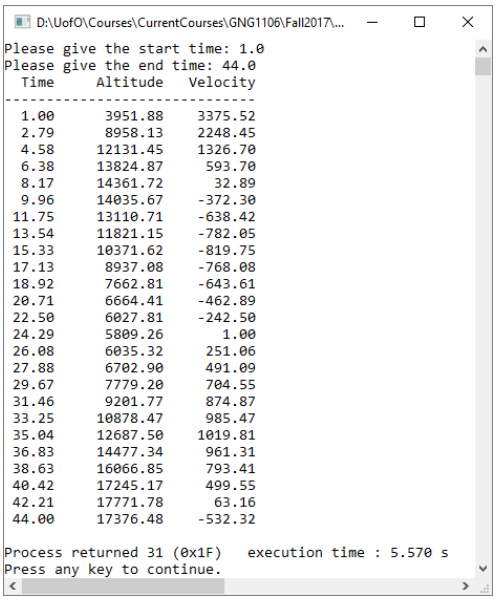
This mark shall be assigned only if the program runs properly (output is given in questionnaire).

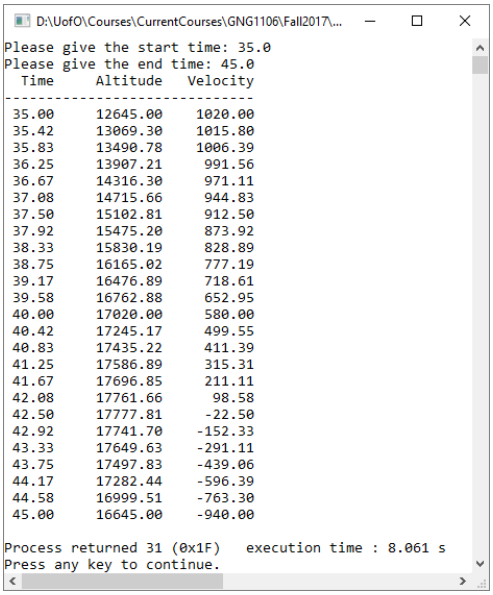
Total	10 marks

Question 3 (15 marks)

Output







Marking Scheme:

C Program

- Structure definition — 1.5 mark
  - 0.2 for each member for total of 1.0
  - 0.5 for `typedef struct { } ALT_V_BALLOON;`
- Main function (2.5 total marks))
  - Comments (header) — 0.5 mark
  - Call to getInput — 0.5 mark
  - Calls to computeAltV — 0.5 mark
  - Function names can be different than those in the solution.
  - Output to display result message — 1 mark
    - 0.5 mark for the loop
    - 0.5 mark for output (printf statements)
    - Deduct -0.5 marks if output is not formatted.
- Function getInput (4.5 marks total)
  - Comments (header) — 0.5 mark
  - Function header/prototype — 0.5 mark
  - Do/while loop (includes use of flag sentinel) — 1 mark
  - Prompt and get values (0.5 for each time values) — 1 mark
  - Check time values (if instruction) — 1.5 mark
    - if () {} (0.5 point)
    - Logical expression (0.5 point)
    - Instruction bloc (flag/printf) (0.5 point)
  - Can also use same logical expression in while and if. Comment that use of 2 logical expressions can lead to bugs if they are not aligned. Using the flag (sentinel) means that you only need to deal with a single logical expression.
- Function computeAltV (5 marks total)
  - Comments (header) — 0.5 mark
  - Function header/prototype — 0.5 mark
  - Variable declarations — 0.5 mark
  - Computation of increment t value — 0.5 mark
  - Initialisation/update of the time variable — 0.5 mark
    - Deduct -0.5 mark if t used to control loop. Integer value always preferable to using real value in a loop.
  - Loop for traversing the arrays for filling arrays — 1.0 mark
  - Update of the time array (rv->t[ix]) — 0.5 mark
  - Update of altitude array (rv->alt[ix]) — 0.5 mark
  - Update of velocities array (rv->v[ix]) — 0.5 mark

Output (0.5 per output) — 1.5 marks

Total — 15 marks