

AE1106: Programming I

Resit Assignment

January 18, 2011

Please read these instructions first:

As an individual assignment, the code and solutions you submit should represent your own work. Discussion with others is not allowed, and neither is the use of online resources other than the standard Matlab help pages (i.e., no Wikipedia, Google searches, chat windows, etc.). During this assignment, the student assistants and the lecturer will only answer questions related to what the question is asking you to do, and will not assist you with how to actually complete the assignment. When finished, you will submit your Matlab source code file(s) to BlackBoard for grading (see below for submission instructions). **The deadline to complete the assignment is 12:00 for morning sessions, and 17:00 for afternoon sessions.** These deadlines are managed automatically by BlackBoard, so it is important that you submit your documents before the deadline in order to receive credit for the assignment (i.e., manage your time so that you start the submission process at least 15 minutes before the deadline). Those students who have been approved by the student counselors to receive extra time on their exams will receive an extra 30 minutes to complete the assignment.

- 1) (2 pts) Write a function called “**sum2n.m**” that takes an integer value, n , as input and returns the sum of the integers from n to $2*n$ if n is nonnegative, or from $2*n$ to n if n is negative. Do NOT use the built-in Matlab functions such as **sum**, **find**, etc., instead use basic for-loops and if-statements. Be sure to include a check to make sure the input value is in fact a non-zero integer.

- 2) (2 pts) Consider the integral $\int_0^4 f(x) dx$ with

$$f(x) = \ln(x + \sqrt{x^2 + 1}) \quad \text{for } 0 \leq x \leq 2$$
$$f(x) = 0.1x^2 - 2x + 5.0436 \quad \text{for } 2 < x \leq 4$$

where “ln” represents the natural logarithm.

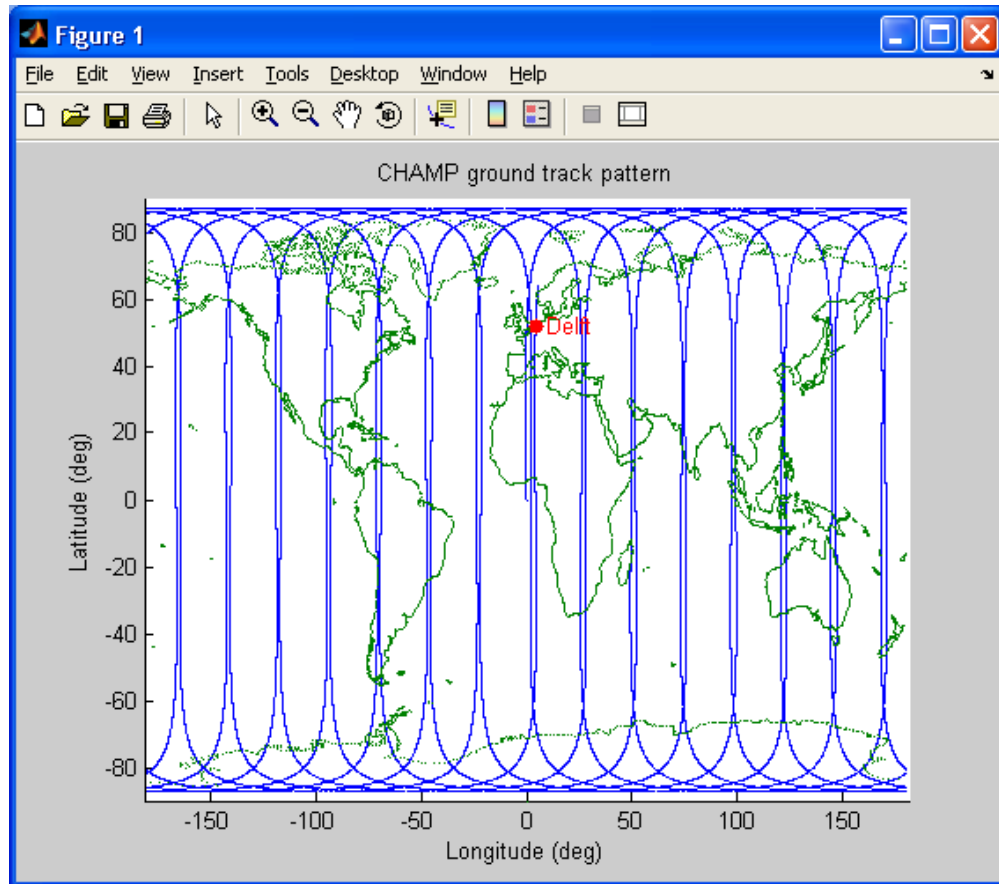
- a) Write a function called “**f2.m**” that computes the value of this function for a given x and then create a script called “**Q2.m**” that uses the built-in Matlab function **quad** to evaluate the integral. Make sure that **f2.m** also works in case the input x is a vector.
- b) Assume the function values of the function specified above are only available for the following ten x -values: [0 0.3 0.8 1.5 2 2.3 2.9 3.2 3.5 4.0]. In the same “**Q2.m**” script, calculate the corresponding function values first and then compute the integral using the trapezium rule.
- 3) (3 pts) The Fibonacci sequence is defined as

$$f_0=0, f_1=1, f_i = f_{i-1} + f_{i-2} \quad \text{for } i = 2, 3, \dots$$

Write a Matlab script called “**fibonacci.m**” that computes the values of the Fibonacci sequence up to $i=25$. Using the **fprintf** command (covered in sessions 7 & 8), have the script print the following (formatted) columns to the screen:

- i
- The Fibonacci number corresponding to i
- The Fibonacci quotient ($q_i = f_i/f_{i-1}$)
- A “1” or “0”, indicating whether the value of i is a prime number or not
- A “1” or “0”, indicating whether the i^{th} Fibonacci number is a prime number or not.
- A “1” or “0”, indicating whether both i and the i^{th} Fibonacci number are **both** prime or not.

The formatting of each column is up to you, but the final output table should be easily understood by the graders. Be sure to include column labels in your output. As a check of your program, the sequence of quotients should converge to the “golden mean”, or $(1 + \sqrt{5})/2$. It should also be the case that if the i^{th} Fibonacci number is prime, then so is i , except for the case when $i=4$.



Submission Instructions

- 1) Your submission should only include the files **sum2n.m**, **f2.m**, **Q2.m**, **fibo.m**, and **gtrack.m**.
- 2) When you are ready to submit your files to BlackBoard, go to the Assignments and then click on the “Resit Assignment” item. This will open a page where you can upload your assignment files.
- 3) By clicking on the “Browse My Computer” button next to the “Attach File” label, you can add one or more files to your assignment submission. You can save the current state of your submission at any time using the “Save as Draft” but your work will not be officially recorded in the system until you click the “Submit” button. After you have submitted the assignment, BlackBoard should then show you a summary page, which lets you know the submission went successfully. **Please be patient after submitting your files, as sometimes it takes a few seconds before BlackBoard registers everything properly.** We recommend that after submission, you wait 15-20 seconds, then go back to the course homepage and proceed again through to the “Resit Assignment” item. After doing this, you should see all of your submitted files in the summary page if everything went smoothly.
- 4) Remember that the submission folder automatically disappears at the deadline, so please make sure you start the submission process well before this time.
- 5) If you made an error and you wish to change a file after your have hit the submit button, you can go back to the “Resit Assignment” link and click on the “Start New Submission” link to repeat the entire process (i.e., do not just submit the updated file, but completely resubmit all files). Note that if you make more than one submission, we will only grade the last attempt.
- 6) As a reminder, please do NOT include special characters in the names of your files, such as “%”, brackets “[]”, underscores “_”, etc., as BlackBoard may have problems with these. Also, do NOT upload a “.mat” or “.asv” file...only upload your “.m” files, or other documents (e.g., MSWord file) if requested.