# PS08 - Answer Sheet

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| --- | --- |
| **Assignment:** | PS 08 |
| **Name:** | <Ranjan Behl>, <rbehl> |
| **Team-ID** | 008-14 |
| **Contributor(s):** | <name> , <Purdue login> [repeat for each] |

## Taylor Series for

Paired

### Paired Partner

Each member of the pair will submit their own answer sheet. List your paired partner here.

|  |  |
| --- | --- |
| Flowchart Partner: | <John Chapla  >, <jchapla> |

### Test Cases

Fill out the table with test case information.

* The *Test Case Description* is an English description of what path is being tested.
* The *Test Case Values* are the values you will use to test the path in the structure or flowchart.
* The *Flowchart Output* is an English description of the flowchart’s result when the test case values go through the structure; it should not be code or MATLAB generated results.
* Add as many rows as necessary to test all possible flowchart paths.
* An example test case is included.

Note: you will also use these test cases to test your completed code.

|  |  |  |
| --- | --- | --- |
| **Test Case Description**  **in English** | **Test Case Values**  **(x, tolerance)** | **Flowchart Output**  **in English** |
| Valid inputs for x and for the tolerance | (0.5,0.05) | * number of terms in series * value of (x) approximation * absolute difference between cos(x) approximation and MATLAB’s cos(x) |
| Invalid input for x | [1.2,0.01] | * Prints error that x is invalid * Returns -99 value for difference * Estimation, and number of terms |
| Invalid input for tolerance | (0.5,3) | * Prints error that tolerance is invalid * Returns -99 value for difference, estimation, and number of terms |

### Variable Tracking Table – by hand

Complete the necessary parts of this table for input arguments (2.5, 0.001). Add rows as necessary.

|  |  |  |  |
| --- | --- | --- | --- |
|  | nth term value | cos(*x*) approximation | Number of Terms |
| Initialization | 0.0001244352 | -0.8011394514 | 0 |
| Iteration 1 | -3.125 | -2.125 | 1 |
| Iteration 2 | 1.628 | -0.497 | 2 |
| Iteration 3 | -0.339 | -0.836 | 3 |
| Iteration 4 | 0.038 | -0.798 | 4 |
| Iteration 5 | -0.003 | -0.801 | 5 |
| Iteration 6 | 0.00012 | -0.80088 | 6 |

## Infinite Fin Model

Individual

### Flowchart for PS08\_fin\_length

*A close up of a map

Description automatically generated*

### Variable Tracking Table – by hand

Complete the necessary parts of this table for the following input arguments:

Rod diameter: 0.005 m

Heat source temperature: 373 K

Ambient air temperature: 298 K

Thermal conductivity of stainless steel: 16 W/(m\*K)

Add additional rows as necessary.

|  |  |  |
| --- | --- | --- |
|  | **Distance from heat source (m)** | **Temperature at distance (K), rounded to nearest whole number** |
| Initialization | 0.01 | 335 |
| Iteration 1 | 0.02 | 316 |
| Iteration 2 | 0.03 | 307 |
| Iteration 3 | 0.04 | 302 |
| Iteration 4 | 0.05 | 300 |
| Iteration 5 | 0.06 | 300 |
| Iteration 6 | 0.07 | 299 |
| Iteration 7 | 0.08 | 298 |

## Approximation of

Paired

### Paired Partner

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|  |  |
| --- | --- |
| Flowchart Partner: | <John Chapla>, <jchapla> |

### Test Cases

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|  |  |  |
| --- | --- | --- |
| **Test Case Description**  **in English** | **Test Case Values**  **(n)** | **Flowchart Output**  **in English** |
| Valid input for n: positive integer | 6 | * approximation, * Absolute difference between MATLAB log(3) and approximation |
| invalid input for n : negative integer | -1 | approximation,  Absolute difference between MATLAB log(3) and approximation |
| Invalid input for n; zero | 0 | approximation,  Absolute difference between MATLAB log(3) and approximation |
| Invalid input for n; non scalar | [1;2] | approximation,  Absolute difference between MATLAB log(3) and approximation |

### Variable Tracking Table – by hand

Complete the necessary parts of this table for input argument n = 3. Leave blank any unneeded cells.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Index** | **nth term in summation** | **Summation** |
| Initialization | 0 | 0 | 1 |
| Iteration 1 | 1 | 1 | 1.1667 |
| Iteration 2 | 2 | 2 | 1.17917 |
| Iteration 3 | 3 | 3 | 1.1814 |
| Iteration 4 |  |  |  |
| Iteration 5 |  |  |  |
| Final Approximation of | | | 1.1814 |