Answer to Problem 2

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1 Requirements and assumptions for Tangent function

The requirements and assumptions of the function tan(x) follow ISO/IEC/IEEE 29148 standards. A priority of 1 means most important and a priority of 5 means least important.

1.1 Assumptions

Assumption ID: F2-ASSUMP1	
Version:	1.0
Type:	Functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Easy
Description:	The user shall provide input in integers
Rationale:	To keep the implementation simple and generate accurate outputs with a simple algorithm

Assumption ID: F2-ASSUMP2	
Version:	1.0
Type:	Functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Easy
Description:	The user shall provide input in range -2^{31} to $2^{31}-1$
Rationale:	The range for the `int` primitive type is from -2^{31} to $2^{31}-1$ and to keep inputs small for a simple implementation

Assumption ID: F2-ASSUMP3	
Version:	1.0
Type:	Non-functional
Owner:	Arnab Roy
Priority:	3
Difficulty:	Easy
Description:	The factorials for the calculation may be pre-stored in an array
Rationale:	To speed up the calculation of the output and execution of the algorithm

1.2 Requirements

Requirement ID: F2-REQ1	
Version:	1.0
Type:	Functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Easy
Description:	When the user enters a value for which cos(x)=0, an exception shall be thrown with an useful error message
Rationale:	Tangent function does not have a valid output for angle=0 and the user shall be let known about this

Requirement ID: F2-REQ2	
Version:	1.0
Type:	Functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Easy
Description:	If the output is -0.0, the function shall remove any signs and return 0.0
Rationale:	Using a sign with 0 is redundant and might be confusing to the user

Requirement ID: F2-REQ3	
Version:	1.0
Type:	Non-functional
Owner:	Arnab Roy
Priority:	3
Difficulty:	Medium
Description:	The time complexity of the program should be in O(n)
Rationale:	To keep program execution fast and within 1 second

Requirement ID: F2-REQ4	
Version:	1.0
Type:	Non-functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Hard
Description:	All angles above 90 degree shall be converted within 90 degrees
Rationale:	Calculation of smaller values is faster and all angles greater than 90 degrees can be converted within 90 degrees, so it is unnecessary to calculate higher values

Requirement ID: F2-REQ5	
Version:	1.0
Type:	Functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Easy
Description:	The output of the function shall be a double
Rationale:	Most outputs of tangents are in decimal and removing the fractional part would make the output inaccurate

Requirement ID: F2-REQ6	
Version:	1.0
Type:	Non-functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Medium
Description:	The output of the tangent function shall be accurate upto 6 digits after the decimal
Rationale:	Implementation of a simple algorithm has the trade-off of accuracy

Requirement ID: F2-REQ7	
Version:	1.0
Type:	Non-functional
Owner:	Arnab Roy
Priority:	1
Difficulty:	Medium
Description:	The output shall be rounded to a value of 7 digits after the decimal
Rationale:	Since the algorithm is accurate upto 6 decimal places and sometimes 7, the output would be rounded to 7 digits after the decimal