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| **Computer Simulation** **( Spring 2017)** |

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| ***Assignment Number:*** | **7** |
| ***Due Date*** |  |
| ***Your Name:*** | **Joseph Abel** |
| ***Your Score/Maximum Score:*** | **/100** |

***Problems:***

**Problem 1**

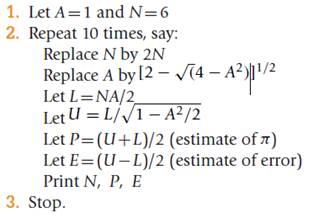
Write a program to compute the sum of the series 12 + 22 + 32 ... such

that the sum is as large as possible without exceeding 1000. The program

should display how many terms are used in the sum.

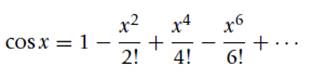
**Problem 2**

The following method of computing π is due to Archimedes:



Write a program to implement the algorithm.

**Problem 3** Use the Taylor series:

 to write a program to compute cos *x* correct to four decimal places (x is in radians).

Test your program to find cos(pi/4), cos(pi/3) and cos(pi/2). In each case, find the percentage of error between the MATLAB function ***cos( )*** and your above calculated values.

1.)

clear all

clc

x=0;

y=x\*x;

count=0;

sum=0;

while sum<=1000

y=x\*x;

if x==14

break;

end

sum=sum+y;

x=x+1;

count=count+1;

end

fprintf('The sum before exceeding 1000 is %d and the amount of terms are %d',sum,count);

% The sum before exceeding 1000 is 819 and the amount of terms are 14>>

2.)

clear all

clc

A=1;

N=6;

for i= 1:10

N=2\*N;

A = (2 - sqrt((4-A.^2))).^0.5;

L= N\*A/2;

U= L/sqrt(((1-A.^2/2)));

P=(U+L)/2;

E=(U-L)/2;

end

fprintf('The estimate of pi is %d\n',P);

fprintf('The error is %d\n',E);

fprintf('The value of N is %d\n',N);

% Output

% The estimate of pi is 3.141593e+00

% The error is 4.106930e-07

% The value of N is 6144

3.)

Clear all

Clc

x=input('Please enter a value of x in radians\n');

n=input('Enter the value of n\n');

Sum\_Of\_Series=0;

Term\_Symbol=1;

Power\_Of\_X=1;

fact=1;

NoFact=0;

for Powers=0:2:n

if Powers ~=0

Power\_Of\_X=Power\_Of\_X\*power(x,2);

fact=fact\*(NoFact+1)\*(NoFact+2);

NoFact=NoFact+2;

end

currentTerm=(Term\_Symbol\*Power\_Of\_X)/fact;

Sum\_Of\_Series=Sum\_Of\_Series+currentTerm;

Term\_Symbol=Term\_Symbol\*-1;

end

percentError=((Sum\_Of\_Series - cos(x))/cos(x))\*100;

fprintf('The value of cos(%f) and the series total is %f \n',x,Sum\_Of\_Series);

fprintf('The Percent error is %f \n',percentError);

%Test 1

% Please enter a value of x in radians

% pi/4

% Enter the value of n

% 8

% The value of cos(0.785398) and the series total is 0.707107

% The Percent error is 0.000003

%Test 2

% Please enter a value of x in radians

% pi/3

% Enter the value of n

% 8

% The value of cos(1.047198) and the series total is 0.500000

% The Percent error is 0.000087

%Test 3

% Please enter a value of x in radians

% pi/2

% Enter the value of n

% 8

% The value of cos(1.570796) and the series total is 0.000025

% The Percent error is 40399038125697.055000