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% Run the GraphBLAS demo2
gbdemo2
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 GBDEMO2 Extreme performance differences: GraphBLAS vs MATLAB.

  Usage:

        gbdemo2             % uses a default bnz = 6000
        gbdemo2 (20000)     % uses bnz = 20000

  The GraphBLAS operations used in gbdemo are perhaps 3x to 50x
  faster than the corresponding MATLAB operations, depending on how
  many cores your computer has.  Here's an example where GraphBLAS is
  asymptotically far faster than MATLAB R2019a: a simple assignment
  for a large matrix C:

        C(I,J) = A

  The matrix C is constructed via C = kron (B,B) where nnz (B) is
  roughly the bnz provided on input (with a default of bnz = 6000),
  so that C will have about bnz^2 entries, or 36 million by default.
  I and J are chosen randomly, and A is 5000-by-5000.

  When the problem becomes large, MATLAB will take a very long time.
  If you have enough memory, and want to see higher speedups in
  GraphBLAS, increase bnz (and be prepared to wait even longer).
  With the default bnz = 6000, this test takes about 4GB of RAM.

  On my Dell XPS 4-core laptop (Intel(R) Core(TM) i7-8565U, 16GB
  RAM), using MATLAB R2019a, when C becomes 9 million by 9 million,
  the computation C(I,J)=A for MATLAB matrices C, I, J, and A takes
  several minutes, whereas GraphBLAS takes less than a second, or
  about 500x faster than MATLAB.  On a desktop with an Intel(R)
  Xeon(R) CPU E5-2698 v4 @ 2.20GHz with 20 hardware cores, the
  speedup over MATLAB is even more dramatic (up to 2,660x has been
  observed).

  See also gb.assign, subsasgn.


# of threads used in GraphBLAS: 4


C(I,J)=A where C is 1 million -by- 1 million
with 35.7126 million entries:

    A is 5000-by-5000 with 49955 entries
    setup time:     0.306698 sec
    GraphBLAS time: 0.271639 sec
    Starting MATLAB ... please wait ...
    MATLAB time:    0.307901 sec
    Speedup of GraphBLAS over MATLAB: 1.13349
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    check time:     0.289698 sec
    all tests passed

C(I,J)=A where C is 4 million -by- 4 million
with 35.8202 million entries:

    A is 5000-by-5000 with 49955 entries
    setup time:     0.315025 sec
    GraphBLAS time: 0.410278 sec
    Starting MATLAB ... please wait ...
    MATLAB time:    0.318524 sec
    Speedup of GraphBLAS over MATLAB: 0.776361
    check time:     0.270203 sec
    all tests passed

C(I,J)=A where C is 9 million -by- 9 million
with 35.928 million entries:

    A is 5000-by-5000 with 49955 entries
    setup time:     0.340506 sec
    GraphBLAS time: 0.400531 sec
    Starting MATLAB ... please wait ...
    MATLAB time:    187.598 sec
    Speedup of GraphBLAS over MATLAB: 468.373
    check time:     0.302882 sec
    all tests passed

C(I,J)=A where C is 16 million -by- 16 million
with 35.916 million entries:

    A is 5000-by-5000 with 49955 entries
    setup time:     0.380551 sec
    GraphBLAS time: 0.446692 sec
    Starting MATLAB ... please wait ...
    MATLAB time:    195.403 sec
    Speedup of GraphBLAS over MATLAB: 437.445
    check time:     0.335302 sec
    all tests passed

C(I,J)=A where C is 25 million -by- 25 million
with 35.964 million entries:

    A is 5000-by-5000 with 49955 entries
    setup time:     0.440228 sec
    GraphBLAS time: 0.406955 sec
    Starting MATLAB ... please wait ...
    MATLAB time:    211.516 sec
    Speedup of GraphBLAS over MATLAB: 519.754
    check time:     0.383543 sec
    all tests passed

C(I,J)=A where C is 36 million -by- 36 million
with 35.976 million entries:
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A is 5000-by-5000 with 49955 entries
setup time:     0.496616 sec
GraphBLAS time: 0.70097 sec
Starting MATLAB ... please wait ...
MATLAB time:    233.345 sec
Speedup of GraphBLAS over MATLAB: 332.889
check time:     0.454673 sec
all tests passed
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