1. The following loops are executed on an Intel CPU with AVX SIMD instructions. These instructions operate on 256-bit *superwords*. Examine each of the following codes and identify if it is vectorizable or not. That is, can the loop be executed in parallel using SIMD methods? If not, state why and suggest way could be changed to permit vectorization.

a.
```
double x[16], y[16];
for (int j = 1; j < 16; ++j)
   x[j] = x[j-1] + y[j];
```

b.
```
double x[16], y[16];
for (int j = 0; j < 16; ++j)
   x[j/2] = x[j] + y[j];
```

c.
```
double x[16], y[16];
for (int j = 0; j < 16; ++j)
   x[j] = x[j] + y[j];
```

d.
```
void f (int n, float *x, float *y, float *z, float alpha)
{
  for (i = 0; i < n; i++)
    z[i] = x[i] + alpha * y[i];
}
```

e.
```
double sum = 0;
for (ptr = head; ptr != NULL; ptr = ptr->next)
   sum = sum + ptr->value;
```

f.
```
float x[8], y[128];
for (int i = 0; i < 128; ++i)
   y[ i ] = y[ i ] + x[ i%8 ];
```