Question 1.

First distribute the calculation of $A(j)$ and $B(j)$ to module $j$. Then use the divide and conquer approach to minimize memory location contention.

Initially $Sum[] = 0$

for($j = 1; j < 64; j += 1$)
  $Sum(j) = A(j) * B(j)$;

for($i = 1; i < 64; i = i * 2$)
  for($j = 0; j < 64; j = j + 2 * i$)
    $Sum(j) = Sum(j) + Sum(j + i)$;

The final result is in $Sum(0)$

Question 2.

for($j = 0; j < 1024; j = j + 4$){

  $S[j] = 0$;
  $S[j + 1] = 0$;
  $S[j + 2] = 0$;
  $S[j + 3] = 0$;

  for($k = 0; k < 1024; k = k + 1$){
  }
}

Question 3.

Assume that the file is stored continuously, and the head only needs to seek the start of the file once.

Seek time = 4ms
Rotational latency = $\frac{0.5R}{100 \text{M} / \text{s}} = 3 ms$
Queuing delay = 20ms
Transfer time = $\frac{100 \text{M}}{80 \text{M} / \text{s}} = 1.25 \text{s} = 1250 \text{ms}$

So average time to read the file is $4 + 3 + 20 + 1250 = 1277 \text{ms}$