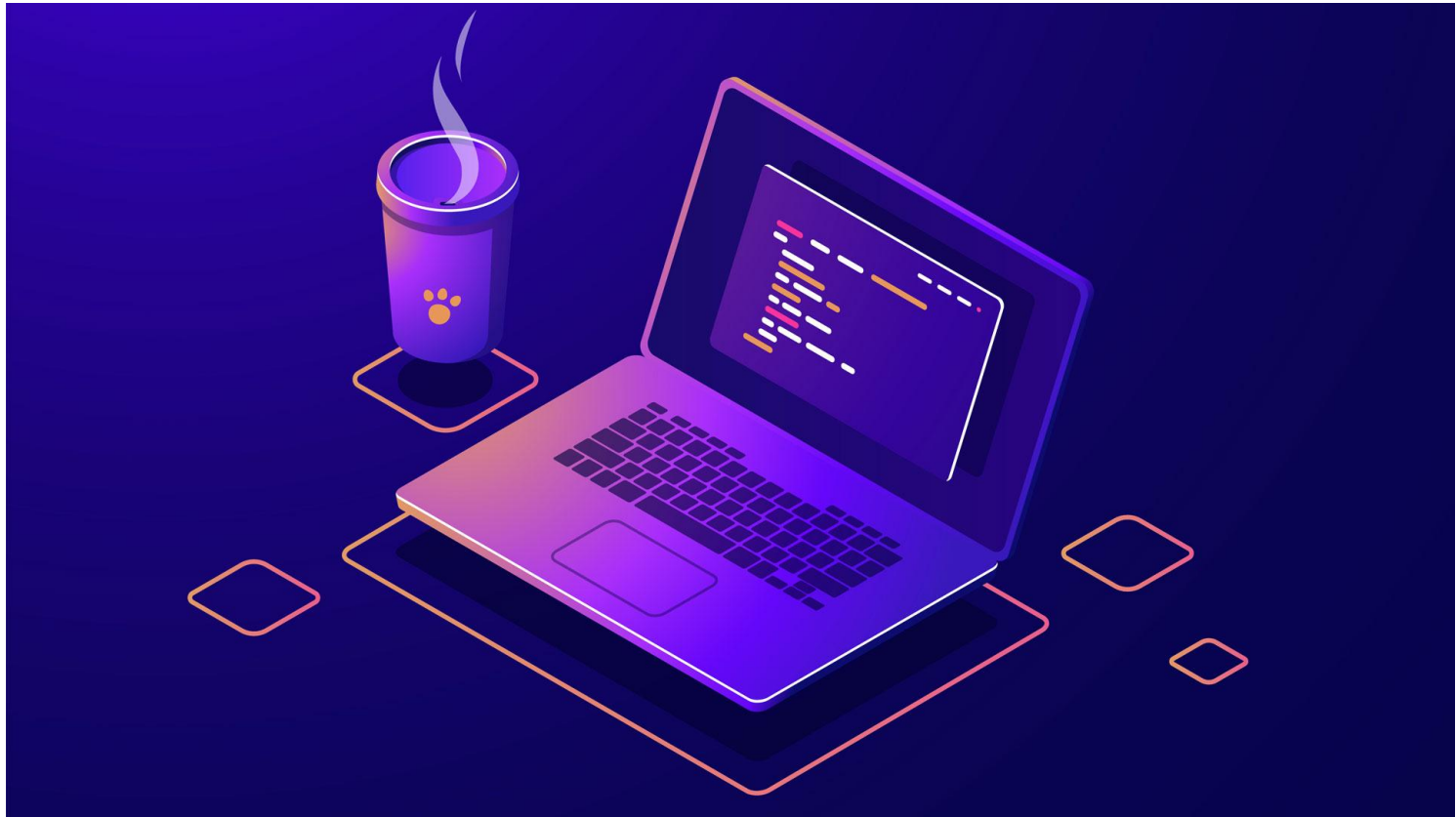# Taskwait and Taskgroup

Taskwait and Taskgroup

▶ Task barriers:

  ▶ `taskwait`: Suspends the execution of the current task, waiting on the completion of its **child tasks**. The taskwait construct is a stand-alone directive.

  ▶ `taskgroup`: Suspends the execution of the current task at the end of structured block, waiting on the completion of **child tasks** of the current task **and their descendent** tasks.

Example of taskwait

```
#pragma omp taskwait
```

```
#pragma omp task {}        // T1
#pragma omp task           // T2
{
    #pragma omp task {}    // T3
}
#pragma omp task {}        // T4

#pragma omp taskwait
                    ←  Only T1, T2 and T4 are guaranteed to have finished here
}
```

Example of taskgroup

```
#pragma omp taskgroup
         structured block
```

```
#pragma omp task {}              // T1
#pragma omp taskgoup
{
    #pragma omp task             // T2
    {
        #pragma omp task {}      // T3
    }
    #pragma omp task {}          // T4
}
```

Only T2, T3 and T4 are guaranteed to have finished here

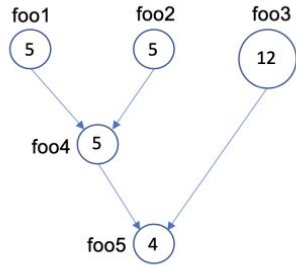# taskwait vs. taskgroup

```
#pragma omp task {}        // T1
#pragma omp task           // T2
{
    #pragma omp task {}  // T3
}
#pragma omp task {}        // T4

#pragma omp taskwait
// Only T1, T2 and T4 are guaranteed to have finished at this point when T5 is created
#pragma omp task {}        // T5



#pragma omp task {}             // T1
#pragma omp taskgroup
{
    #pragma omp task           // T2
    {
        #pragma omp task {}  // T3
    }
    #pragma omp task {}        // T4
}
// Only T2, T3 and T4 are guaranteed to have finished at this point when T5 is created
#pragma omp task {}            // T5
```
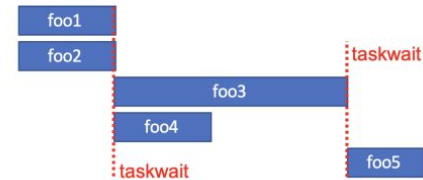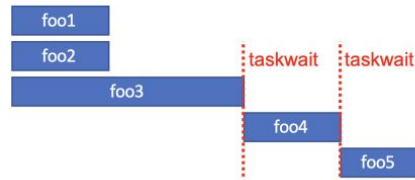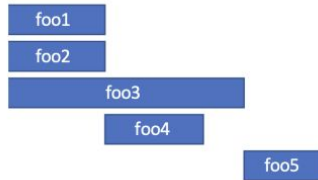
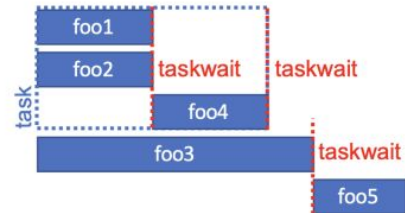# Given a TDG to implement with the OpenMP tasking model:


```
#pragma omp task
foo1()
#pragma omp task
foo2()
#pragma omp task
foo3()
#pragma omp taskwait
#pragma omp task
foo4()
#pragma omp taskwait
#pragma omp task
foo5()
```

```
#pragma omp task
foo1()
#pragma omp task
foo2()
#pragma omp taskwait
#pragma omp task
foo3()
#pragma omp task
foo4()
#pragma omp taskwait
#pragma omp task
foo5()
```
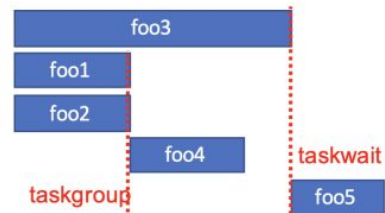
```
#pragma omp task                    #pragma omp task
  {                                  foo3()
  #pragma omp task                   #pragma omp taskgroup
  foo1()                               {
  #pragma omp task                     #pragma omp task
  foo2()                               foo1()
  #pragma omp taskwait                 #pragma omp task
  #pragma omp task                     foo2()
  foo4()                               }
  #pragma omp taskwait               #pragma omp task
  }                                  foo4()
#pragma omp task                     #pragma omp taskwait
foo3()                               #pragma omp task
#pragma omp taskwait                 foo5()
#pragma omp task
foo5()
```
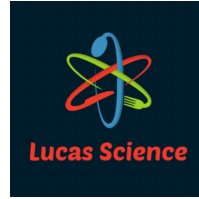
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