

# CnC-Python Partition String Example

Please refer to the [Find-Primes example](#) before starting with this example.

First, define the CnC graph for the partition string example:

## PartitionString.cnc

```
<string singletonTag>;
<string spanTags>;
[string->string input];
[string->string span];
[string->string results];

<singletonTag> :: (python createSpan);
<spanTags> :: (python processSpan);

// program inputs and outputs

env -> [input];
env -> <singletonTag>;
[results] -> env;

// producer/consumer relations

[input] -> (createSpan) -> <spanTags>, [span];
[span] -> (processSpan) -> [results];
```

This graph is a little more interesting than the [Find-Primes example](#) since it has two Steps: `createSpan` and `processSpan`. `createSpan` produces Items for the `span` Item Collection. This in turn triggers the prescription of the `processSpan` step which writes results to the `results` Item Collection. The environment reads off these values from the `results` Item Collection.

Next, run the CnC-Python translator:

```
cnc_t PartitionString.cnc
```

Next, we need to provide the python implementations for the Steps using the generated templates (as explained in the [Find-Primes example](#)). Note the implementation of the `createAwaitsList` function in both the python Step classes which defines the input dependences on values from the Item Collections.

## userPartitionStringApp.py

```
class Application:
    @staticmethod
    def onStart(args, input, singletonTag):
        # TODO fill out the body of the function
        # e.g. operation on output item collections: anItemCollection.put(aTag, aValue)
        # e.g. operation on tag collections: aTagCollection.putTag(aTag)
        if len(args) > 0:
            firstArg = args[0]
            print("py: processing " + firstArg)
            input.put(firstArg, firstArg)
            singletonTag.putTag(firstArg)
        else:
            print("py: usage PartitionStringMain <the_string_to_process>")

    @staticmethod
    def onEnd(results):
        # e.g. operation on input item collections: anItemCollection.get(aTag)
        # e.g. operation on input item collections: anItemCollection.printContents()
        results.printContents()
```

## userCreateSpanStep.py

```
class CreateSpanStep:
    @staticmethod
    def createAwaitsList(tupleContainer, tag , inInput):
        # TODO fill out the body of the function
        # e.g. tupleContainer.add(itemCollection, tagValue)
        # e.g. operation on item collections: anItemCollection.get(aTag)
        tupleContainer.add(inInput, tag)

    @staticmethod
    def compute(tag , inInput, ctrlSpanTags, outSpan):
        # TODO fill out the body of the function
        # e.g. operation on input item collections: anItemCollection.get(aTag)
        # e.g. operation on output item collections: anItemCollection.put(aTag, aValue)
        # e.g. operation on tag collections: aTagCollection.putTag(aTag)
        def computeRun(x, y):
            if len(x) == 0:
                return [y]
            else:
                curRun = x[-1]
                if curRun[-1] == y:
                    x[-1] = curRun + y
                    return x
                else:
                    x.append(y)
                    return x

        inStrVal = inInput.get(tag)
        inList = reduce(computeRun, inStrVal, [])
        for spanStr in inList:
            outSpan.put(spanStr, spanStr)
            ctrlSpanTags.putTag(spanStr)
        return True
```

## userProcessSpanStep.py

```
class ProcessSpanStep:
    @staticmethod
    def createAwaitsList(tupleContainer, tag , inSpan):
        # e.g. tupleContainer.add(itemCollection, tagValue)
        # e.g. operation on item collections: anItemCollection.get(aTag)
        tupleContainer.add(inSpan, tag)

    @staticmethod
    def compute(tag , inSpan, outResults):
        # e.g. operation on input item collections: anItemCollection.get(aTag)
        # e.g. operation on output item collections: anItemCollection.put(aTag, aValue)
        # e.g. operation on tag collections: aTagCollection.putTag(aTag)
        try:
            inStr = inSpan.get(tag)
            if len(inStr) % 2 != 0:
                outResults.put(inStr, inStr)
            return True
        except Error:
            print("py: NativeProcessSpanStep.compute error!")
            return False
```

Running this program with an input of 1111111111aaaaaaaaammmmmmmmeeeeeeeeeeeeee should produce the following output:

```
Running PartitionStringMain
Starting PartitionStringMain...
...
py: processing 1111111111aaaaaaaaammmmmmmmeeeeeeeeeeeeee
...
Contents of py:PartitionString.ResultsItemCollection [size=3]
'eeeeeeeeeeeeeee' = eeeeeeeeeeeeeee
'1111111111' = 1111111111
'mmmmmmmmm' = mmmmmmmmm
```