Uzochi Dimkpa
Extracting 1D
ITCS 5145–001
Parallel Computing
Prof. Erik Saule
January 25, 2023

1

- Tasks: $a[i] \equiv 1, f(a[i]) \equiv 1, \boldsymbol{\Theta(N) = \boxed{2N}}$
- **Dependencies:** $\boxed{\boldsymbol{a[i] \rightarrow f(x) \rightarrow b[i]}}$
- $\boldsymbol{width = \boxed{n}}$
- $\boldsymbol{\sum p_i = \boxed{2n}}$
- $\boldsymbol{T_\infty = \boxed{2}, length = \boxed{2}}$

2

- Tasks: $\text{read}(array[0]) \equiv 1, \text{write}(result) = array[0] \equiv 1, \text{read}(result) \equiv 1, \text{read}(array[i]) \equiv 1, \text{op}(\text{x}, \text{y}) \equiv 3, \text{write}(result) \equiv 1, \text{read}(result) \equiv 1, \boldsymbol{\Theta(N)} = 1 + 1 + N \times (1 + 1 + 3 + 1) + 1 = \boxed{\boldsymbol{6N + 3}}$
- **Dependencies:**
  $\boxed{\boldsymbol{\text{write}(result) = array[0] \rightarrow \text{read}(result) + \text{read}(array[i]) \rightarrow \text{op}(\text{x}, \text{y}) \rightarrow \text{write}(result) \rightarrow \text{read}(result)}}$
- $\boldsymbol{width = \boxed{2}}$
- $\boldsymbol{\sum p_i = \boxed{6N + 3}}$
- $\boldsymbol{T_\infty = \boxed{6N + 3}, length = \boxed{6}}$

3

- Tasks: $\text{write}(pr[0]) = 0 \equiv 1, \text{read}(arr[i]) \equiv 1, \text{read}(pr[i]) \equiv 1, \text{add}(arr[i], pr[i]) \equiv 3, \text{write}(pr[i + 1]) \equiv 1, \boldsymbol{\Theta(N)} = 1 + N \times (1 + 1 + 3 + 1) = \boxed{\boldsymbol{6N + 1}}$
- **Dependencies:**
  $\boxed{\boldsymbol{\text{write}(pr[0]) \rightarrow \text{read}(arr[i]) + \text{read}(pr[i]) \rightarrow \text{add}(arr[i], pr[i]) \rightarrow \text{write}(pr[i + 1])}}$
- $\boldsymbol{width = 2}$
- $\boldsymbol{\sum p_i = \boxed{6N + 3}}$
- $\boldsymbol{T_\infty = \boxed{6N + 3}, length = \boxed{4}}$