SSC0951 **Desenvolvimento de Código Otimizado**

Atividade 1 **Profiling**

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1. Resultados individuais

A seguir os resultados obtidos nas métricas selecionadas no trabalho separados por experimentos. As métricas conferidas são:

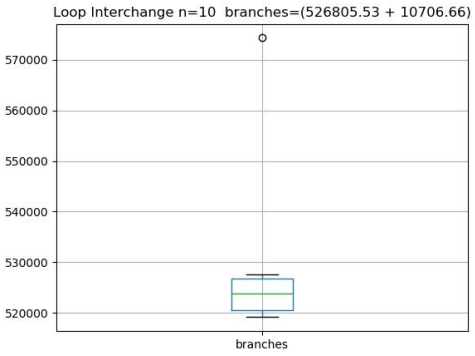
- **L1-loads:** referente ao valor bruto recebido por L1-dcache-loads
- **L1-misses-raw:** referente ao valor L1-dcache-load-misses
- **L1-misses:** referente à porcentagem recebida em L1-dcache-load-misses
- **branches:** referente ao valor bruto recebido por branches
- **branches-misses-raw:** referente ao valor bruto recebido em branch-misses
- **branches-misses:** referente à porcentagem recebida em branch-misses

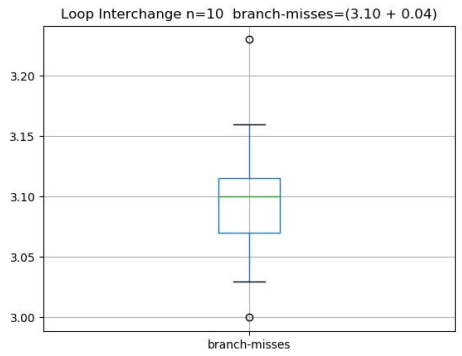
Cada gráfico exibe o título em seu topo contendo o valor médio e o intervalo de confiança calculados.

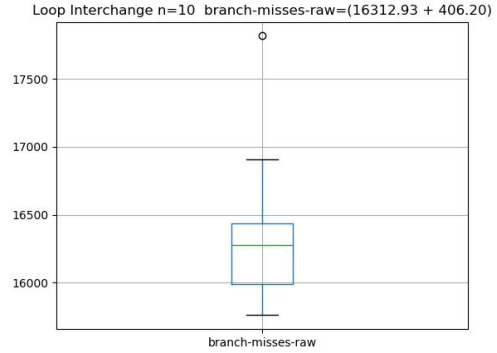
Experimento	Dimensão *N*	Técnica *U* ou *I*	L1-dcache loads	L1-dcache loads-misses	branch-instructions	branch-misses
1	10^1	U	800e3 + 2e3	48e3 + 3e3	524e3 + 2e3	16,2e3 + 0,2e3
2	10^2	U	20.730e3 + 0,2e3	210e3 + 5e3	1.190e3 + 2e3	18e3 + 0,2e3
3	10^3	U	19.370e6 + 0,4e6	1.260e6 + 0,8e6	257.410e3 +24e3	1.310e3 + 2e3
4	10^1	I	810e3 + 20e3	45e3 + 2e3	520e3 + 10e3	16,3e3 + 0,4e3
5	10^2	I	23.427e3 +1e3	183e3 + 2e3	2.985e3 + 1e3	28,3e3 + 0,1e3
6	10^3	I	220.661e5 + 7e5	134e6 + 4e6	20.463e5 + 0,4e5	127e4 + 0,7e4

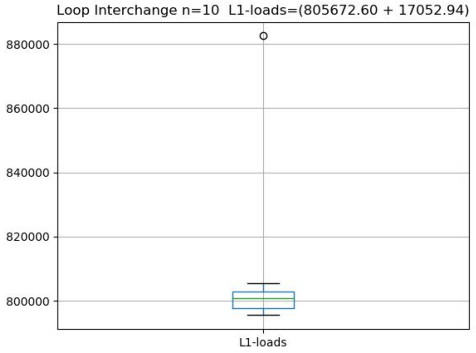
Tabela 1 - Resultados obtidos na prática 1. As siglas na coluna técnica representam os métodos de Loop Interchange (I) e Loop Unrolling (U).

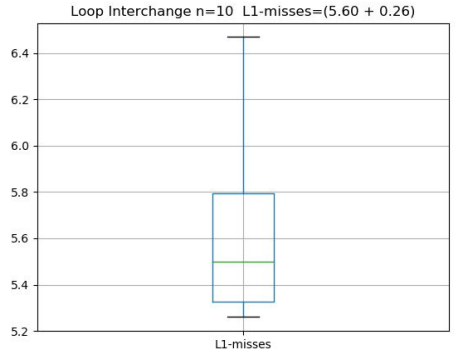
1.1. Loop Interchange (N = 10)

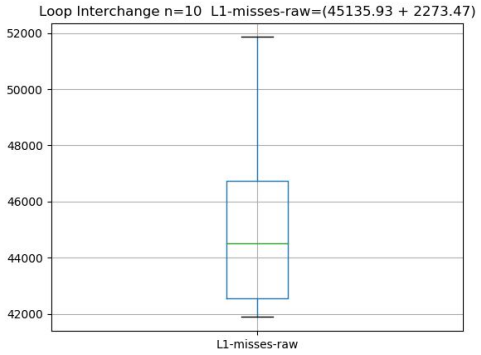




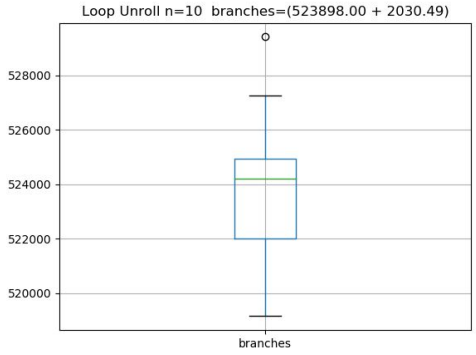


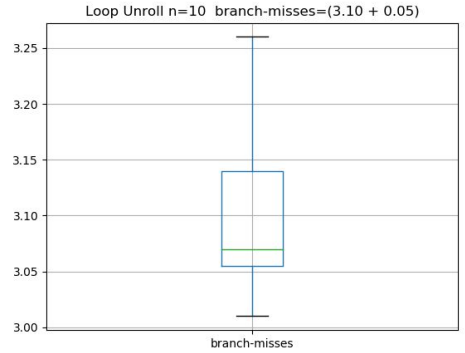


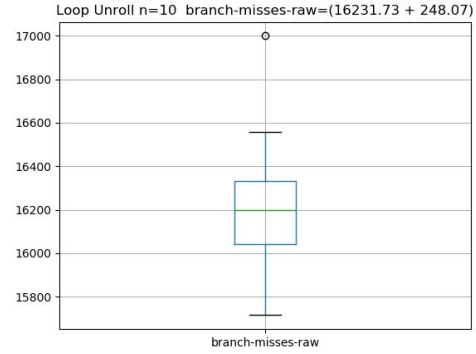


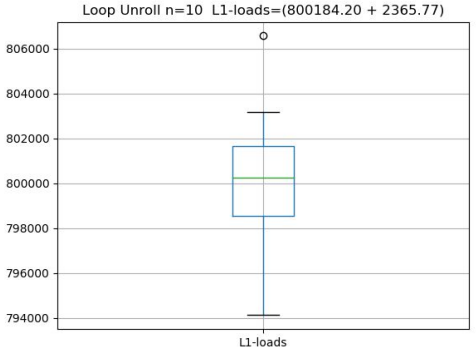


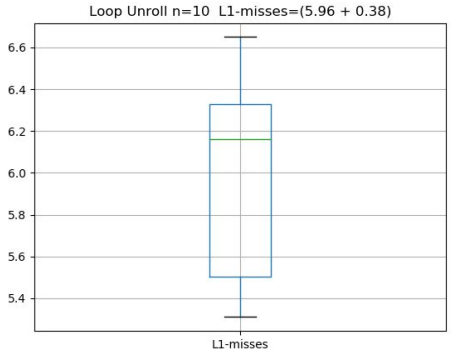
1.2. Loop Unrolling (N = 10)

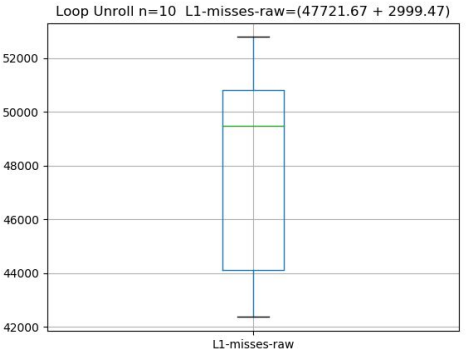




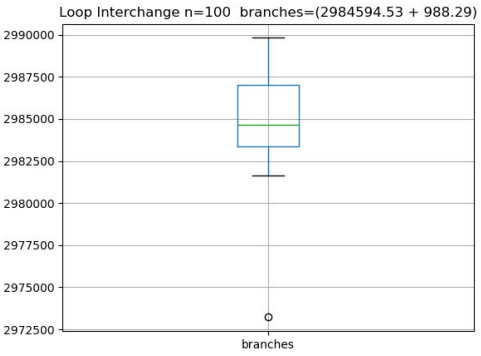


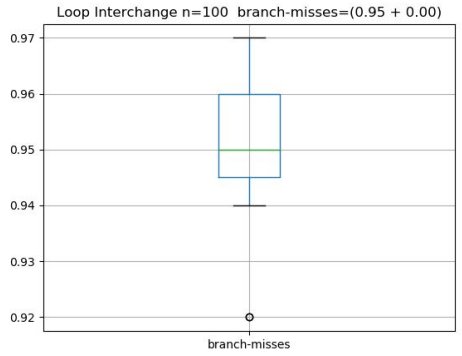


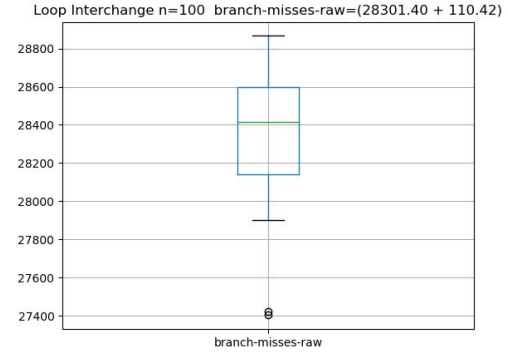


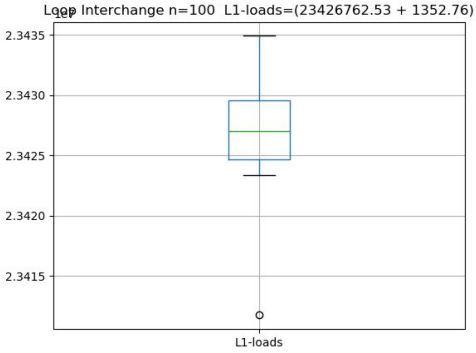


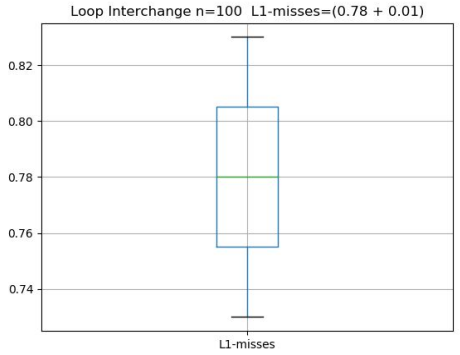
1.3. Loop Interchange (N = 100)

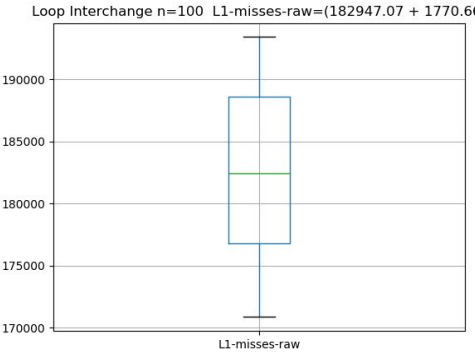




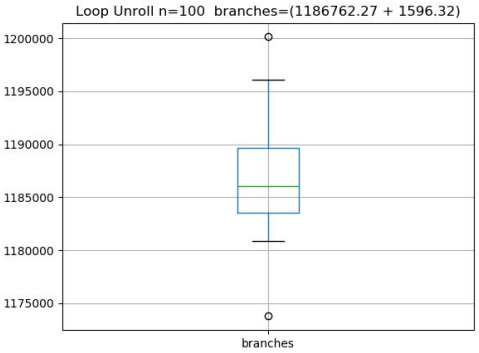


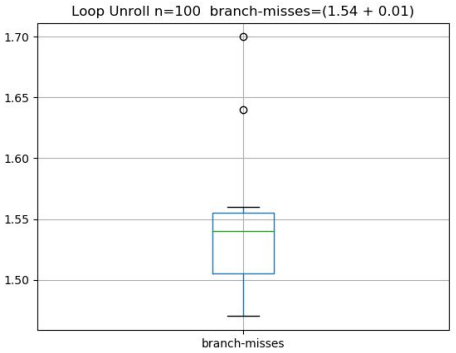


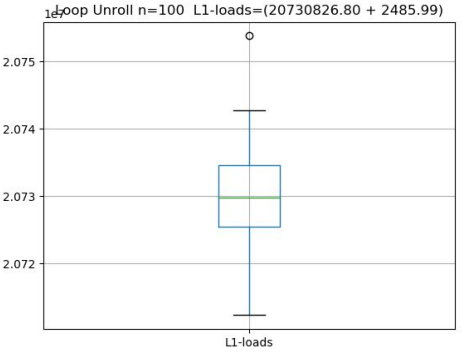


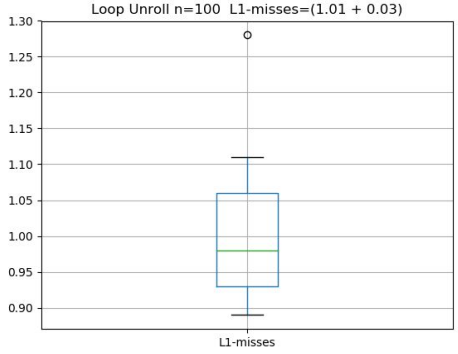


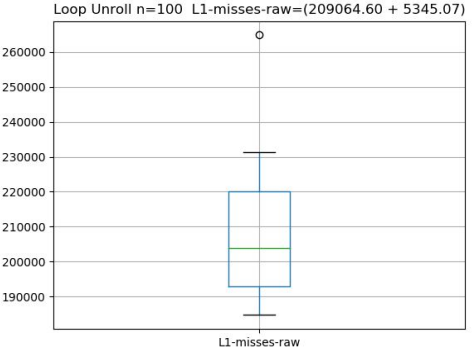
1.4. Loop Unrolling (N = 100)



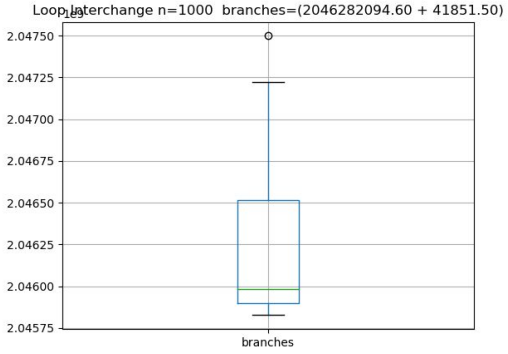


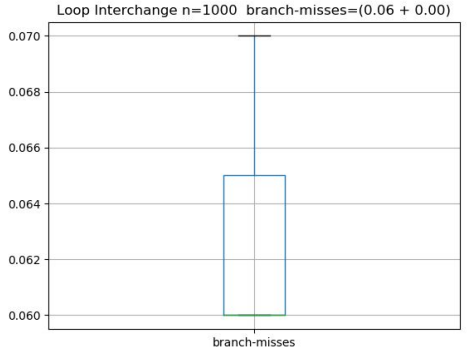


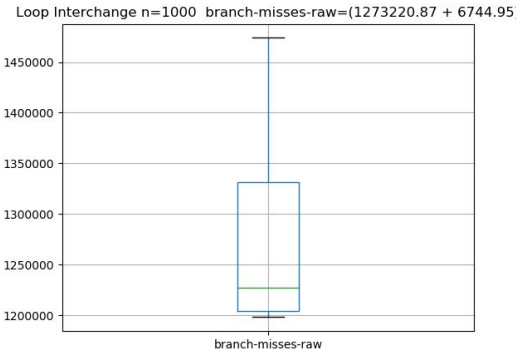


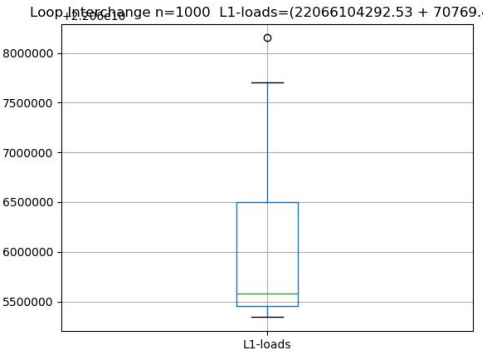


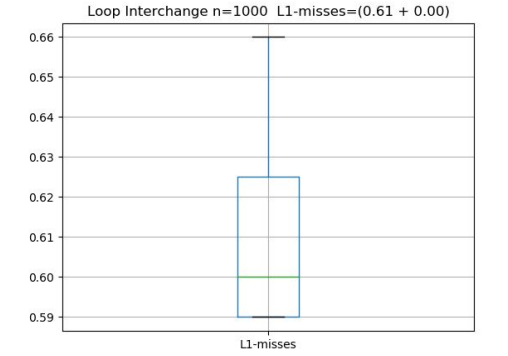
1.5. Loop Interchange (N = 1000)

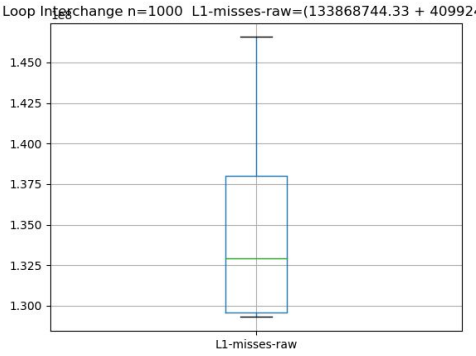




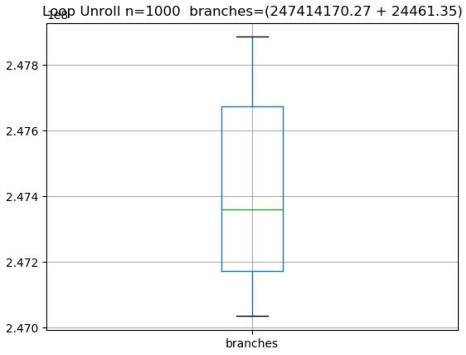


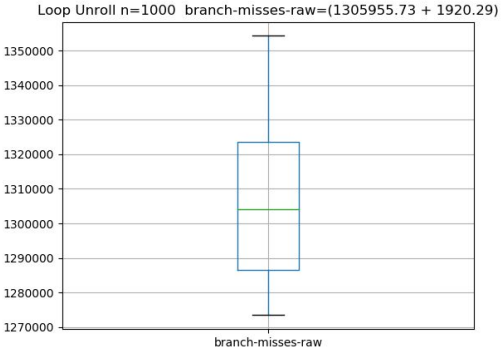


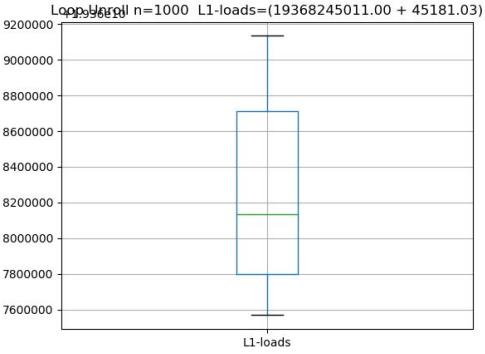


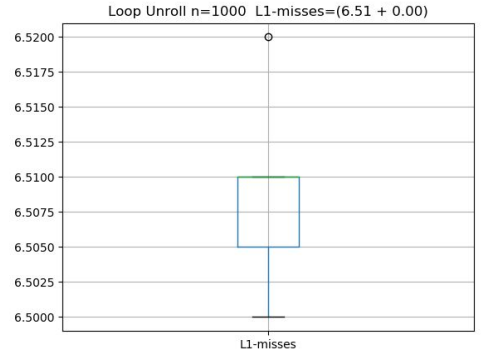


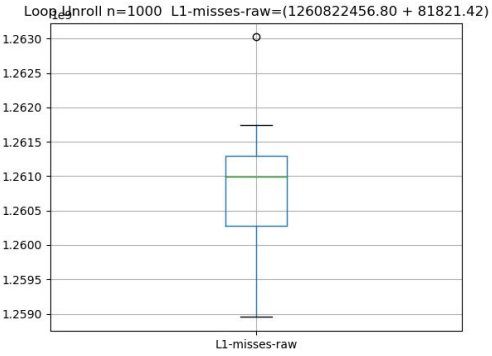
1.6. Loop Unrolling (N = 1000)







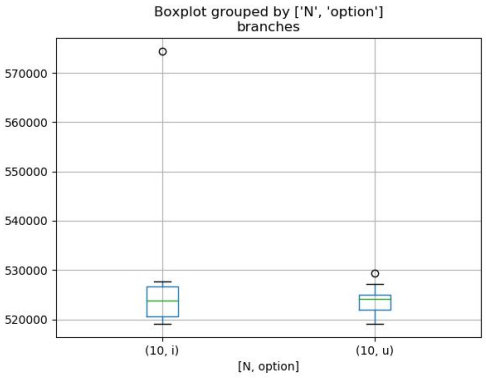


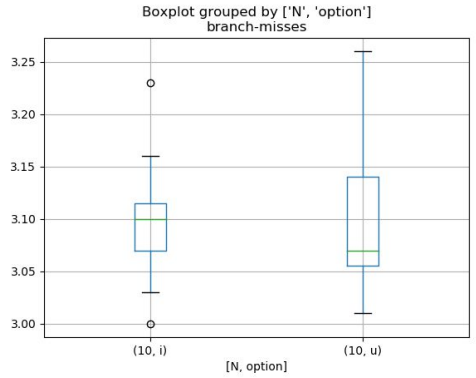


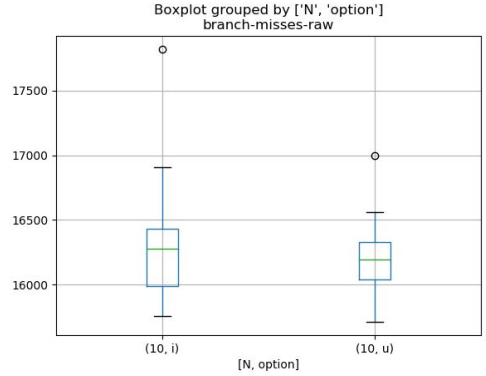
2. Comparação de resultados

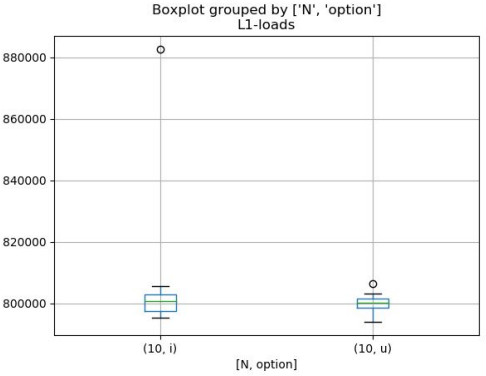
Para o comparação dos resultados foi separado por métrica e também pelo tamanho utilizado (N) pois os valores 10^3 acabavam exigindo um eixo y com intervalo muito grande comprometendo a legibilidade.

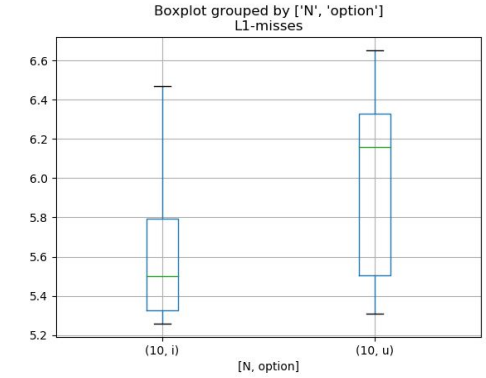
2.1. Métricas para 10^1

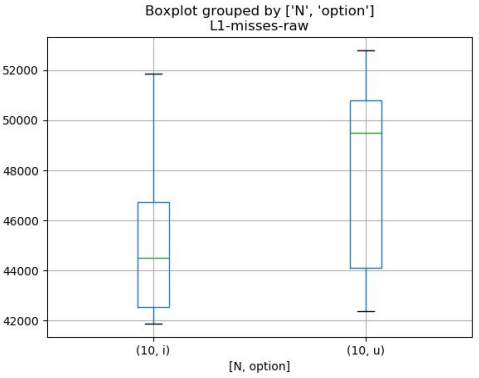




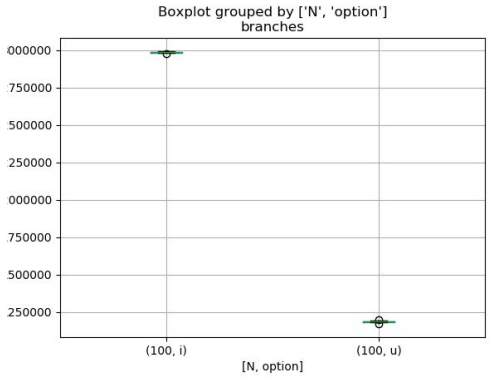


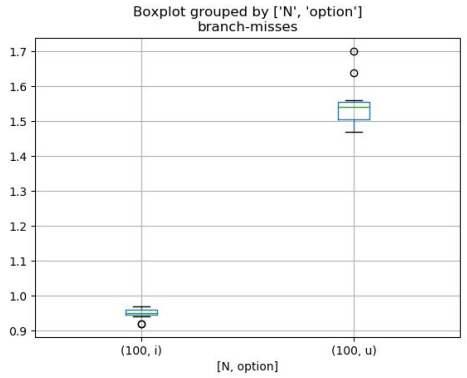


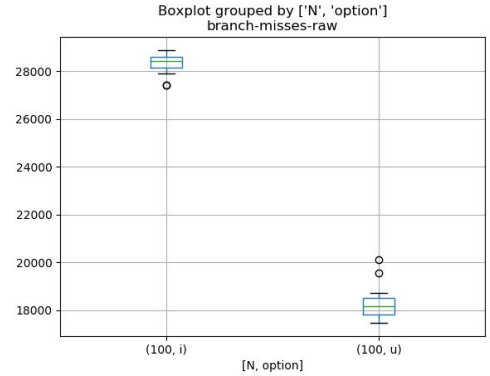


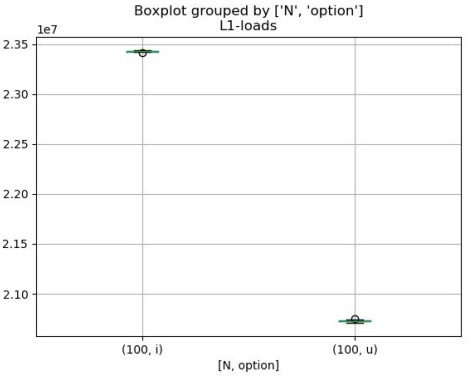


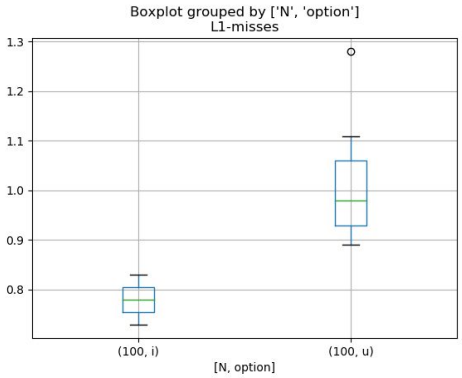
2.2. Métricas para 10^2

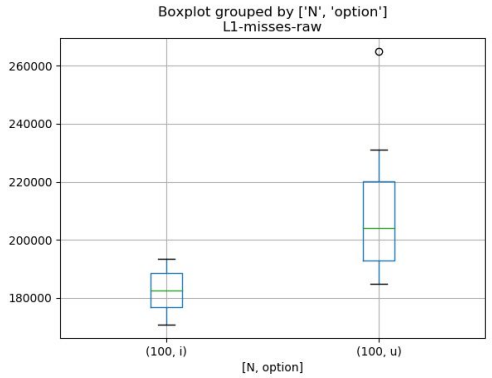




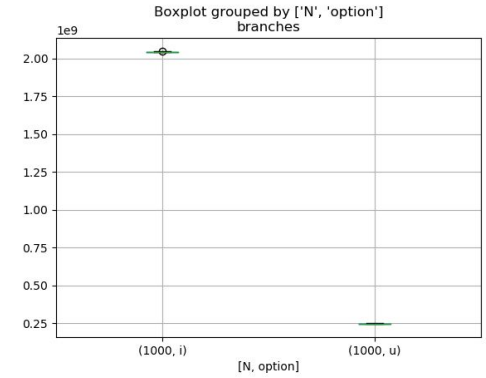


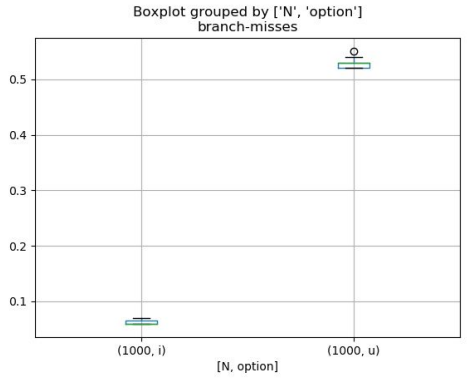


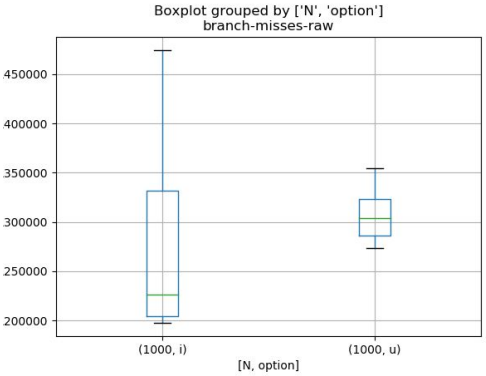


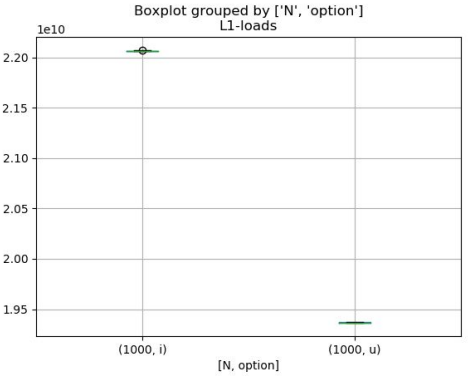


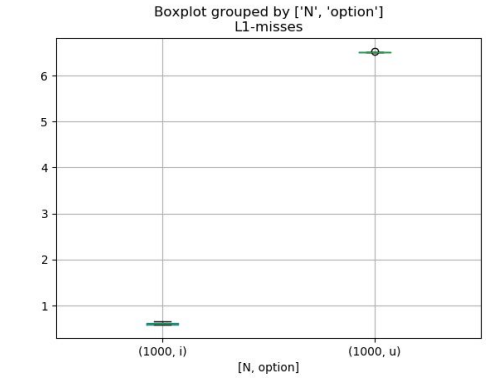
2.3. Métricas para 10^3

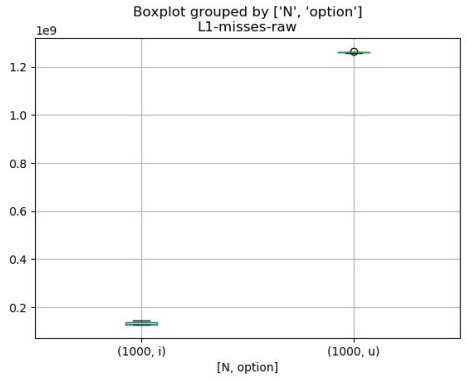












3. Conclusão

Vemos de maneira evidente que a técnica de Loop Interchange diminui a quantidade de L1-load-misses e isso fica explícito mesmo para valores pequenos como N = 10^1.

Já a técnica de Loop Unrolling apresenta um aumento na porcentagem de branches-misses. No entanto ao analisarmos a quantidade de branches bruta (primeiro gráfico acima). Vemos que ela realiza algo na ordem de 10^8 comparado à 10^9 alcançada pelo Loop Interchange.