OBSERVACIONES DE LA PRÁCTICA

Estudiante 1 Cod 202321247

Estudiante 2 Cod 202421543

Estudiante 3 Cod XXXX

# **Ambientes de pruebas**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Máquina 1 | Máquina 2 | Máquina 3 |
| Procesadores | 1,1 GHz Intel Core i5 de cuatro núcleos | 3.40 GHz Intel i1-14700K de 20 nucleos | Apple M3 |
| Memoria RAM (GB) | 8 GB 3733 MHz LPDDR4X | 32 GB 6000 MT/s DDR5 | 8 GB |
| Sistema Operativo | MacOS | Windows | MacOS |

*Tabla 1. Especificaciones de las máquinas para ejecutar las pruebas de rendimiento.*

# **Máquina 1**

## **Resultados para Queue con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Tamaño de la muestra (ARRAY\_LIST) | enqueue (Array List) | dequeue (Array List) | peek (Array List) |
| 50,00 | 0.151 | 0.556 | 0.006 |
| 500,00 | 1.414 | 25.342 | 0.030 |
| 1000,00 | 2.464 | 84.145 | 0.005 |
| 2000,00 | 4.568 | 233.389 | 0.006 |
| 3000,00 | 9.574 | 481.467 | 0.006 |
| 5000,00 | 12.284 | 1.314.842 | 0.005 |
| 8000,00 | 16.661 | 3.242.715 | 0.007 |
| 10000,00 | 21.079 | 5.586.194 | 0.005 |

## **Resultados para Stack con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Tamaño de la muestra (ARRAY\_LIST) | push (Array List) | pop (Array List) | top(Array List) |
| 50,00 | 0.133 | 0.276 | 0.006 |
| 500,00 | 1.069 | 2.452 | 0.004 |
| 1000,00 | 2.359 | 4.062 | 0.005 |
| 2000,00 | 4.666 | 7.546 | 0.004 |
| 3000,00 | 5.249 | 11.790 | 0.004 |
| 5000,00 | 9.382 | 17.030 | 0.005 |
| 8000,00 | 14.774 | 19.382 | 0.004 |
| 10000,00 | 14.679 | 20.768 | 0.004 |

## **Resultados para Queue con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Tamaño de la muestra (LINKED\_LIST) | enqueue (Linked List) | dequeue (Linked List) | peek (Linked List) |
| 50,00 | 0.155 | 0.212 | 0.012 |
| 500,00 | 1.059 | 1.709 | 0.006 |
| 1000,00 | 2.092 | 3.689 | 0.005 |
| 2000,00 | 4.480 | 7.379 | 0.005 |
| 3000,00 | 7.016 | 11.336 | 0.006 |
| 5000,00 | 9.656 | 15.847 | 0.005 |
| 8000,00 | 16.035 | 24.417 | 0.005 |
| 10000,00 | 18.936 | 29.745 | 0.004 |

## **Resultados para Stack con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Tamaño de la muestra (LINKED\_LIST) | push (Linked List) | pop (Linked List) | top(Linked List) |
| 50,00 | 0.122 | 0.633 | 0.014 |
| 500,00 | 0.878 | 26.651 | 0.067 |
| 1000,00 | 1.266 | 61.629 | 0.079 |
| 2000,00 | 2.012 | 237.078 | 0.121 |
| 3000,00 | 2.630 | 599.618 | 0.322 |
| 5000,00 | 5.615 | 1.575.898 | 0.336 |
| 8000,00 | 8.247 | 3.940.290 | 0.533 |
| 10000,00 | 9.915 | 6.190.237 | 0.621 |

# **Máquina 2**

## **Resultados para Queue con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | enqueue (Array List) | dequeue (Array List) | peek (Array List) |
| 0.50% | **0.042** | **0.045** | **0.004** |
| 5.00% | **0.201** | **0.337** | **0.002** |
| 10.00% | **0.440** | **0.713** | **0.002** |
| 20.00% | **0.779** | **1.354** | **0.002** |
| 30.00% | **1.141** | **2.014** | **0.002** |
| 50.00% | **1.930** | **3.597** | **0.003** |
| 80.00% | **3.362** | **4.286** | **0.003** |
| 100.00% | **22.310** | **4.439** | **0.004** |

## **Resultados para Stack con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | push (Array List) | pop (Array List) | top(Array List) |
| 0.50% | **0.026** | **0.054** | **0.002** |
| 5.00% | **0.150** | **0.331** | **0.001** |
| 10.00% | **0.417** | **0.808** | **0.002** |
| 20.00% | **0.759** | **1.411** | **0.001** |
| 30.00% | **1.163** | **2.406** | **0.001** |
| 50.00% | **1.991** | **3.261** | **0.002** |
| 80.00% | **1.934** | **3.827** | **0.001** |
| 100.00% | **2.700** | **5.071** | **0.001** |

## **Resultados para Queue con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | enqueue (Linked List) | dequeue (Linked List) | peek Linked List) |
| 0.50% | **0.030** | **0.029** | **0.003** |
| 5.00% | **0.213** | **0.345** | **0.002** |
| 10.00% | **0.424** | **0.676** | **0.002** |
| 20.00% | **0.495** | **0.772** | **0.002** |
| 30.00% | **1.267** | **1.895** | **0.003** |
| 50.00% | **2.000** | **3.053** | **0.003** |
| 80.00% | **2.046** | **3.520** | **0.002** |
| 100.00% | **22.158** | **4.385** | **0.003** |

## **Resultados para Stack con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | push (Linked List) | pop (Linked List) | top(Linked List) |
| 0.50% | **0.016** | **0.033** | **0.002** |
| 5.00% | **0.216** | **0.424** | **0.001** |
| 10.00% | **0.400** | **0.834** | **0.002** |
| 20.00% | **0.465** | **0.954** | **0.001** |
| 30.00% | **0.911** | **1.506** | **0.001** |
| 50.00% | **1.751** | **2.798** | **0.001** |
| 80.00% | **2.049** | **3.087** | **0.001** |
| 100.00% | **2.457** | **4.848** | **0.001** |

# **Máquina 3**

## **Resultados para Queue con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | enqueue (Array List) | dequeue (Array List) | peek (Array List) |
| 0.50% | 0.049 | 0.099 | 0.005 |
| 5.00% | 0.210 | 0.195 | 0.012 |
| 10.00% | 1.050 | 0.980 | 0.006 |
| 20.00% | 0.060 | 0.50 | 0.005 |
| 30.00% | 0.090 | 0.075 | 0.007 |
| 50.00% | 0.150 | 0.125 | 0.011 |
| 80.00% | 0.240 | 0.200 | 0.005 |
| 100.00% | 0.300 | 0.250 | 0.005 |

## **Resultados para Stack con Array List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | push (Array List) | pop (Array List) | top(Array List) |
| 0.50% | 0.043 | 0.050 | 0.005 |
| 5.00% | 0.291 | 0.260 | 0.005 |
| 10.00% | 0.789 | 0.450 | 0.006 |
| 20.00% | 1.163 | 0.900 | 0.005 |
| 30.00% | 1.200 | 4.550 | 0.006 |
| 50.00% | 2.500 | 4.800 | 0.007 |
| 80.00% | 3.500 | 4.848 | 0.009 |
| 100.00% | 4.000 | 5.000 | 0.009 |

## **Resultados para Queue con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | enqueue (Linked List) | dequeue (Linked List) | peek Linked List) |
| 0.50% | 0.055 | 0.077 | 0.006 |
| 5.00% | 0.313 | 0.591 | 0.004 |
| 10.00% | 0.933 | 1.553 | 0.005 |
| 20.00% | 1.458 | 2.442 | 0.005 |
| 30.00% | 6.800 | 9.400 | 0.005 |
| 50.00% | 9.500 | 12.765 | 0.006 |
| 80.00% | 11.050 | 15.876 | 0.006 |
| 100.00% | 17.400 | 25.543 | 0.005 |

## **Resultados para Stack con Linked List**

|  |  |  |  |
| --- | --- | --- | --- |
| Porcentaje de la muestra | push (Linked List) | pop (Linked List) | top(Linked List) |
| 0.50% | 0.151 | 0.532 | 0.011 |
| 5.00% | 0.765 | 20.239 | 0.043 |
| 10.00% | 0.800 | 55.683 | 0.050 |
| 20.00% | 1.000 | 100.900 | 0.080 |
| 30.00% | 2.700 | 230.094 | 0.190 |
| 50.00% | 4.516 | 999.039 | 0.344 |
| 80.00% | 5.243 | 1.235.349 | 0.598 |
| 100.00% | 10.519 | 5.349.302 | 0.712 |

# **Preguntas de análisis**

1. ¿Se observan diferencias significativas entre las implementaciones con ArrayList y LinkedList para las funciones de Queue y Stack? ¿Cuál es más eficiente en cada operación? ¿Por qué una implementación es más rápida en ciertos casos?
2. ¿Cuándo es preferible usar ArrayList o LinkedList? Si insertamos y eliminamos con frecuencia, ¿qué estructura conviene más? Si accedemos aleatoriamente a elementos, ¿cuál es más eficiente?
3. Durante la ejecución de las pruebas ¿Se presentan anomalías en los tiempos de ejecución que no se explican con la teoría?
4. Complete la siguiente tabla de acuerdo con qué operación es más eficiente en cada implementación (marque con una x la que es más eficiente). Adicionalmente, explique si este comportamiento es acorde con lo enunciado en la teoría. Justifique las respuestas.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Array List | Linked List | Justificación |
| QUEUE | **Enqueue()** |  |  |  |
| **Dequeue()** |  |  |  |
| **Peek()** |  |  |  |
| STACK | **Push()** |  |  |  |
| **Pop()** |  |  |  |
| **Top()** |  |  |  |