**Resumen:**

Algoritmos de planificación:

1.- FCFS (First Come, First Served)

No Expropiativa

FIFO (First In, FIrst Out)

2.- SJF (Shortest Job First)

No Expropiativa

SJN (Short Job Next – El trabajo más corto primero)

3.- RR (Round Robin) - Expropiativa

4.- SRT (Shortest Remainder Time) – Expropiativa

5.- Prioridad no expropiativa.

Tretorno = Tfinalización – Tllegada

Tretorno = Es el tiempo que transcurre desde que un proceso se crea hasta que se completa por el sistema.

Tespera = Tretorno - Tejecución

Tespera = Corresponde al tiempo que un proceso consume esperando la asignación de recursos debido a la competencia con otros.

Trespuesta = Corresponde al intervalo de tiempo que transcurre desde que se señala un evento hasta que se ejecuta la primera instrucción de la rutina de dicho evento. En definitiva, es el tiempo que está esperando en el estado de preparado o bloqueado para empezar a ejecutarse.

Para obtener el tiempo de respuesta mirar los diagramas de Gantt o las tablas de ejecución de procesos y mirar en que tiempo empieza cada proceso.

**Actividades:**

1. **Representar gráficamente la gestión que realizará la CPU si utiliza los algoritmos de planificación vistos en clase para los procesos de la siguiente tabla, completando los datos de la misma para cada algoritmo:**
2. **Round-Robin (quantum = 3)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| P1 | 0 | 9 | **1** | **12** | **12** | **3** |
| P2 | 5 | 4 | **7** | **19** | **14** | **10** |
| P3 | 7 | 6 | **13** | **22** | **15** | **9** |
| P4 | 9 | 3 | **16** | **18** | **9** | **6** |

Usa la siguiente tabla para la representación gráfica de ejecución de los procesos:

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | P1 | P1 | P1 | P1 | P1 | P1 | P2 | P2 | P2 | P1 | P1 | P1 | P3 | P3 | P3 | P4 | P4 | P4 | P2 | P3 | P3 | P3 |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| P1 | P1 | P1 | P1 | P1 | P2 | P2 | P1 | P1 | P1 | P3 | P3 | P3 | P4 | P4 | P4 | P2 | P2 | P2 | P3 |  |  |  |
|  |  |  |  |  |  |  | P3 | P3 | P3 | P4 | P4 | P4 | P2 | P2 | P2 | P3 | P3 | P3 |  |  |  |  |
|  |  |  |  |  |  |  |  |  | P4 | P2 | P2 | P2 |  |  |  |  |  |  |  |  |  |  |

**B) FCFS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| P1 | 0 | 9 | **1** | **9** | **9** | **0** |
| P2 | 5 | 4 | **10** | **13** | **8** | **4** |
| P3 | 7 | 6 | **14** | **19** | **12** | **6** |
| P4 | 9 | 3 | **20** | **22** | **13** | **10** |

Usa la siguiente tabla para la representación gráfica de ejecución de los procesos:

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 | P3 | P3 | P4 | P4 | P4 |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| P1 |  |  |  |  | P2 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 | P4 | P4 | P4 | P4 | P4 | P4 |  |  |  |
|  |  |  |  |  |  |  | P3 | P3 | P3 | P4 | P4 | P4 | P4 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | P4 |  |  |  |  |  |  |  |  |  |  |  |  |  |

**C)SJF**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| P1 | 0 | 9 | **1** | **9** | **9** | **0** |
| P2 | 5 | 4 | **13** | **16** | **11** | **7** |
| P3 | 7 | 6 | **17** | **22** | **15** | **9** |
| P4 | 9 | 3 | **10** | **12** | **3** | **0** |

Usa la siguiente tabla para la representación gráfica de ejecución de los procesos:

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P4 | P4 | P4 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 | P3 | P3 |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| P1 |  |  |  |  |  |  |  |  | P4 | P4 | P4 | P2 | P2 | P2 | P2 | P3 | P3 | P3 |  |  |  |  |
|  |  |  |  |  | P2 | P2 | P2 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | P3 | P3 | P3 | P3 | P3 |  |  |  |  |  |  |  |  |  |  |  |

**D) SRT**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| P1 | 0 | 9 | **1** | **9** | **9** | **0** |
| P2 | 5 | 4 | **13** | **16** | **11** | **7** |
| P3 | 7 | 6 | **17** | **22** | **15** | **9** |
| P4 | 9 | 3 | **10** | **12** | **3** | **0** |

Usa la siguiente tabla para la representación gráfica de ejecución de los procesos:

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P4 | P4 | P4 | P2 | P2 | P2 | P2 | P3 | P3 | P3 | P3 | P3 | P3 |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| P1 |  |  |  |  | P2 | P2 | P2 | P2 | P4 | P4 | P4 | P2 | P2 | P2 | P2 | P3 |  |  |  |  |  |  |
|  |  |  |  |  |  |  | P3 | P3 | P2 | P2 | P2 | P3 | P3 | P3 | P3 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | P3 | P3 | P3 |  |  |  |  |  |  |  |  |  |  |  |

1. **Representar gráficamente la gestión que realizará la CPU si utiliza los algoritmos de planificación vistos en clase para los procesos de la siguiente tabla, completando los datos de la misma para cada algoritmo:**
2. **Round-Robin (quantum = 3)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 3 | **1** | **7** | **7** | **4** |
| B | 1 | 5 | **2** | **16** | **15** | **10** |
| C | 3 | 2 | **4** | **5** | **2** | **0** |
| D | 9 | 5 | **10** | **18** | **9** | **4** |
| E | 12 | 5 | **13** | **20** | **8** | **3** |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | A | B | B | C | C | A | A | B | B | D | D | D | E | E | E | B | D | D | E | E |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| A | B |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. **Round-Robin (quantum = 4)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 3 | **1** | **7** | **7** | **4** |
| B | 1 | 5 | **2** | **17** | **16** | **11** |
| C | 3 | 2 | **4** | **5** | **2** | **0** |
| D | 9 | 5 | **10** | **19** | **10** | **5** |
| E | 12 | 5 | **13** | **20** | **8** | **3** |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | A | B | B | C | C | A | A | B | B | D | D | D | E | E | E | E | B | D | D | E |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. **SRT**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 3 | **1** | **3** | **3** | **0** |
| B | 1 | 5 | **6** | **10** | **9** | **4** |
| C | 3 | 2 | **4** | **5** | **2** | **0** |
| D | 9 | 5 | **11** | **15** | **6** | **1** |
| E | 12 | 5 | **16** | **20** | **8** | **3** |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - | A | A | A | C | C | B | B | B | B | B | D | D | D | D | D | E | E | E | E | E |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. **Representar gráficamente la gestión que realizará la CPU si utiliza los algoritmos de planificación vistos en clase para los procesos de la siguiente tabla, completando los datos de la misma para cada algoritmo:**

**a) FCFS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 1 |  |  |  |  |
| B | 0 | 10 |  |  |  |  |
| C | 0 | 2 |  |  |  |  |
| D | 0 | 2 |  |  |  |  |
| E | 0 | 6 |  |  |  |  |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**b) SJF**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 1 |  |  |  |  |
| B | 0 | 10 |  |  |  |  |
| C | 0 | 2 |  |  |  |  |
| D | 0 | 2 |  |  |  |  |
| E | 0 | 6 |  |  |  |  |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**c) SRT**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 1 |  |  |  |  |
| B | 0 | 10 |  |  |  |  |
| C | 0 | 2 |  |  |  |  |
| D | 0 | 2 |  |  |  |  |
| E | 0 | 6 |  |  |  |  |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Preparados:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**d) RR (quantum = 1).**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proceso** | **Ciclo de llegada** | **Ciclos Totales de CPU** | **Ciclo Inicial** | **Ciclo Final** | **Tiempo de Retorno** | **Tiempo de Espera** |
| A | 0 | 1 |  |  |  |  |
| B | 0 | 10 |  |  |  |  |
| C | 0 | 2 |  |  |  |  |
| D | 0 | 2 |  |  |  |  |
| E | 0 | 6 |  |  |  |  |

Ejecución:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Preparados:

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
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**e) Tiempo de retorno de cada algoritmo junto con la media.**

**f) Tiempo de espera de cada algoritmo junto con la media.**

**g) Tiempo de respuesta de cada algoritmo junto con la media.**

**h) Analizando los resultados ¿Qué algoritmo es el mejor?**