

OPERATING SYSTEMS

İstem Yönetimi Algoritmaları

✗ Kesintisiz: FIFO - LIFO - PS - SJF - RS

✗ Kesintili: RR - SRT

→ Amaç: Düşük zamanda iş miktarını artırmak, toplam beklemeyi azaltmak

✗ FIFO: First in First out / Kugruk Yapısı / First Come First Served

✗ LIFO: Last in First out

✗ RS: Random Scheduling

✗ SJF: Shortest Job First

✗ PS: Priority Scheduling (Düşük derecede olan ONCE girer)

✗ CPU Utilization: It is defined as the value of time CPU is in use.

The goal of the CPU scheduling is to maximize the CPU utilization.

✗ Throughput: It is defined as the number of processes that are completed per time unit.

✗ Turnaround Time: It is defined as a total time which spent to "Toplam Süre" complete the process from the time of submission to the time of completion.

✗ Response Time: It is defined as the time it takes to start responding, "Gelismeye Başlama" not the time it takes to output the response.

Anı

✗ Waiting Time: It is defined as the total time a process has been waiting in the ready queue.

✗ Context Switch: It is defined as a computing process of storing and restoring state of a CPU so that execution can be resumed from same point at a later time. Context switch are usually computationally intensive lead to usage of time, memory, scheduler overhead somuch of the design of operating system is to optimize these switches

Round Robin

Quantum Time: Her process'in tek bir sefer çalışması için ayrılan max. süre

✗ Total Time = (Arrival + Burst) // Bitiş Zamanı - Süresi

Shortest Remaining Time (SRT)

Güktüğü - (Girdiği + İşlem Süre) - (Zaman + Süre)

DEADLOCK

✗ Aynı anda aynı kaynaktaki kullanımın birden çok process var.

✗ Deadlock engellenmesi fakat yok edilebilir.

→ İstem (Process) → İşlemci (Thread) → Starvation: Tek İstem

✗ Deadlock Şartları

1) Karşılıklı Dilasma 2) Göbek Bağımsız 3) Barottlanaçılık 4) Belirli (Mutual Exclusion) (Multiple Independent Request) (Nonpreemptive) (Circular)

Operating System: The software that controls the hardware

O.S. Parts: Kernel Services - Library Services - App Level Services

✗ The core of OS is KERNEL => Responds to calls from process interrupt from devices

✗ OS is resource management.

The main resource of Computer Hardware => Processors - Storage - Input/Output Devices Communication Devices - Data

→ OS: Goals => by running processes in low privilege and providing services

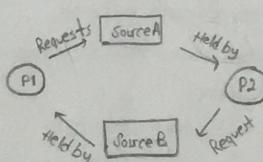
DEADLOCK

→ Sistem kaynaklarını ortak kullanan veya birbirile ilgilenecek bir grup prosesin kalıcı olarak bloke olması = Ölümçül Kilitlenme

+ Proses'in bir kaynaktaki elinde tutup digerini istemesi

Kasıtlılar

✗ Karşılıklı Dilasma => Proses'in kaynaktaki bir kaynaktan elindeki kaynaktan alınıyorsa



① Karşılıklı Dilasma = Paylaşılan ortak kaynak

② Tut ve Bekle = Kaynak isteyen Process'in elinde başka k. daimasını sağlanmak

③ Etkin Degil = İsteklerinin bir kısmını sağlayıp, beklemesi

PAGING (SAYFALAMA)

✗ Yeni işlemlerin yüklenmesi, bilen işlemlerin kaldırılması sonucu oluşan baltıklar (External Fragments)

✗ İşlem Adresleri (Logical A.) Hafızaadlı Adres (Physical A.)

Offset = Logical Address % Page Size

Page Number = Logical A. / Page S.

PN'in Base'i + Offset = Physical Address

FIFO - LRU (Least Recently Used) - OPT (Optimal Replacement) Gelecek PAGE REPLACEMENT

Bellek = Verilerin konumlandırılmasının, düzenlendirilmesi ve izlenmesi gereken alanların sağlanması sağlar

✗ Paylaşım ve Verimlilik

Bellek Yöneticisi = Belleğin kullanım durumu / Bellek tahsis / Deallocate Bellek ile Disk blokları ilişkisi

Bellek Yönetimi = Relocation / Protection / Sharing / Logical - Physical Organization

First Fit - Best Fit - Quick Fit (Listeleme)

Aynı anda tek işlem çalışması = MUTEX
Race Condition

CPU Scheduling

Multiprogramming

Jobs, are programs that run w/out user interaction.

User, time shared are programs that may have user interaction.

CPU - I/O burst cycle = CPU times are generally much shorter than I/O times

Preemptive Scheduling = Interrupt

CPU Scheduling ① Switches : From Running to Waiting State

Decisions = ② F R to Ready S

③ F W to Ready

④ Terminates

↳ Scheduling under 1 to 4 is nonpreemptive, others are preemptive.

Dispatcher, switching context / to user mode /

jumping to the proper location Restart

Criteria For Performance Evaluation

Utilization = The fraction of time a device is in use.

Throughput = # of Job completions in a period of time

Service Time = The time required by a device to handle a request.

Queueing Time = Time on a queue waiting for service from the device.

Residence Time = Service Time + Queueing Time

Response Time = Time used by a system to respond to a User job

Think Time = The time spent by the user of an interactive system to figure out the next request.

→ Round Robin, no priority-based preemption.

Deadlock = If each process in the set is waiting for an event that only another process in the set can cause.

None of the processes can ... -run / release resources / be awakened

Conditions

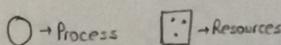
① Mutual Exclusion = Each resource assigned to 1 process / Spool Everything (mutex)

② Hold and Wait = Process holding resources can request additional / resources initially

③ No preemption = Take resources away / Only the process on release its held resource

④ Circular Wait = Order resources numerically

Starvation's Solution is FIFO



→ No Cycles NO Deadlock

✓ Cycles May be OK

Dosya isimleri = NUL - AU X - CON - COM1 - PRN - NUL

→ Resource = Request - Use - Release

→ All deadlocks are unsafe, but all unsafes are NOT deadlocks

DOSYA SİSTEMLERİ

↳ Veriler varlıkların doğa içерisinde sürdürürlük.

↳ DS verileri depolar. DS içinde veriler kalıcıdır.

↳ DS işlemlerin es zamanlı olarak erişimini sağlar.

↳ DS işletim sist. tarafından yönetilir. (FILE MANAGER)

İsimlendirme = OS'e bağlıdır. Digit ve sembollerden oluşur.

1-8 Karakter Max. 255 Karakter

DOS-Windows (Karakter Duygusu) UNIX-LINUX (Duygular)

İki parçalı dosya sistemi (+ ile ayrılr).

Uzantılar = Dosyanın türsü değil, içerdigi bilginin türsü verdır.

Hangi programla açılıp, isten yapılmak üzere bilinir.

UNIX-LINUX uzantılarla uygunlaşmıştır.

Türleri = Dosyanın D. = Regular Files. Kullanıcı verilerini saklar. ASCII / Binary

(Windows) Sistem D. = System F. = Dosyalar, dosya sist. yapısı yönetmek.

(Unix) = Character F. = I/O kaynakları

Block F. = Disk modellene

File Structure =



Module Name

Date

Owner

Protection

Size

File Access = Sequential A. = Basit text d.

Random A. = Veri Tabanı d., Film d.

File Attributes = Owner / Creator / Protection / Read Only Flag

Hidden F. / Archive F. / Last Modified Date

File Operations = Create / Delete / Open / Read / Write / Append

Close / Seek / Rename

Directories / Folders = Dosyaları işlemek ve organize etmek için kullanılır. Dosyalar toplu olarak bulunur.

DOS-UNIX-LINUX => Directory , W=FOLDER

→ Tekli Directory = ROOT İki Seviyeli = Forklı Directory

Directory Operations = Create / Delete / OpenDir / Readdir / Closedir / Rename Link

Path Naming = Nokta(.) = Şu anda çalışılan dizin
İki N.(..) = Üst dizin

Dosyalama = Dosyalar bloklar halinde depolanır.

İzleme = Linked List / Nodes / Contiguous Allocation

Block Size = Fixed Sized Blocks (UK)

↓ Kolay Adreslenebilir / Hizip / Okuma (Veri)

Contiguous All. → Sıralı yerlesim, Okuma hizisi, Dizgeye uygun (-)

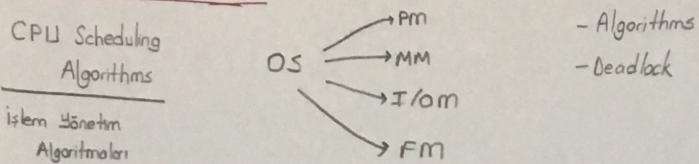
Linked List → Rastgele yayas, Link kaybi

Dosya Yerlesim Tablosu (FAT) = Extra yer kapları

OPERATING SYSTEMS

04.10.2016
Sali

1



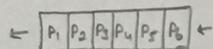
→ Kesintisiz : FIFO LIFO PS SJF RS → Kesintili: RR SRT

✓ Düşük zamanda iş miktarını artırmak, bekleme süresini azaltmak (toplarm)

\times FIFO : First in First out

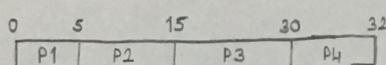
FCFS : First come First served

Kuyruk yapısı



Ex :

P ₁	5ms
P ₂	10ms
P ₃	15ms
P ₄	2ms



$$P_1 = 0$$

$$P_2 = 5$$

$$P_3 = 15$$

$$P_u = 30$$

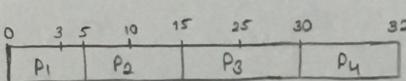
Bekleme

Sorensen

$$\text{Toplam B.S.} = 50 \quad \text{Ort.} = \frac{50}{4} = 12,5 \text{ m/s}$$

Ex

		Arrival
P1	5ms	0
P2	10ms	3
P3	15ms	10
P4	20ms	25



$$P_1 = 0$$

$$P_2 = 5 - 3 = 2$$

$$P_3 = 15 - 10 = 5$$

$$P_u = 30 - 25 = 5$$

$$\text{Ave} = 12/4 = 3$$

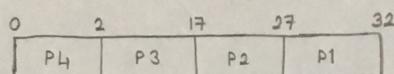
Ex :

Tarih	İşlem Türü	Miktar	Fiyat	Tutar
01.06.2016	Mayıs 011 devir	20	1000	20000
06.06.2016	Mal alıştı	10	1265	12650
10.06.2016	Üretim sevk	25	?	?
15.06.2016	Mal alıştı	8	1380	11040
25.06.2016	Üretim sevk	2	?	?

STOK KARTI											
			GİRİŞ			ÇIKIŞ			KALAN		
TARİH	AGİKLAMA	M	F	T	M	F	T	M	F	T	
01.06	Stok							20	1000	00000	
06.06	Alış	10	1265	12650				10	1265	12650	
10.06	Stok				20	1000	00000	5	1265	6325	
15.06	Alış	8	1380	11040				5	1265	6325	
25.06	Serv				2	1265	2530	2	1265	3995	
TAHZİTAW								11	11040	14855	

X LIFO : Last in First out

P1	5
P2	10
P3	15
P4	2



$$P_1 = 27$$

$$P_2 = 17$$

$$P_3 = 2$$

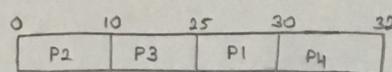
$$P_4 = 0$$

$$\text{Total} = 46$$

$$\text{Ave} = 46/4 = 11.5$$

X RS : Random Scheduling

P2 - P3 - P1 - P4



$$P_1 = 25$$

$$P_2 = 0$$

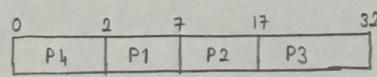
$$P_3 = 10$$

$$P_4 = 30$$

$$\text{Total} = 65$$

X SJF : Shortest Job First

P4 - P1 - P2 - P3



$$P_1 = 2$$

$$P_2 = 7$$

$$P_3 = 17$$

$$P_4 = 0$$

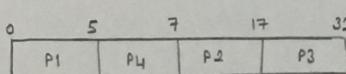
$$\text{Total} = 26$$

X PS : Priority Scheduling

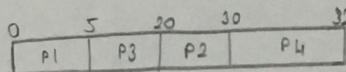
Priority

P1-0, P2-2, P3-3, P4-1

	Arrival Time	Priority
P1-5	0	0
P2-10	6	1
P3-15	0	2
P4-2	6	3



$$\left. \begin{array}{l} P_1 = 0 \\ P_2 = 7 \\ P_3 = 17 \\ P_4 = 5 \end{array} \right\} 29$$



X CPU Utilization : It is defined as the value of time CPU is in use.

The goal of the CPU scheduling is to maximize the CPU utilization.

X Throughput : It is defined as the number of processes that are completed per time unit.

X Turnaround Time : It is defined as a total time which is spent to complete the process from the time of submission to the time of completion.
"Totalm Sure"

X Response Time : It is defined as the time it takes to start responding, not the time it takes to output the response. "Galawmaya Baslano Am"

X Waiting Time : It is defined as the total time a process has been waiting in the ready queue.

X Context Switch : It is defined as a computing process of storing and restoring state of a CPU so that execution can be resumed from some point at a later time. Context switch are usually computationally intensive lead to usage of time, memory, scheduler overhead so much of the design of operating system is to optimize these switches.

Round Robin

11.10.2016
Soh
3

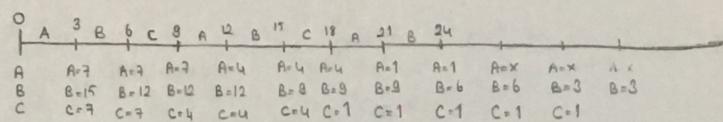
quantum time: Her process'in tek bir sefer çalışması için ayrılan maksimum süre

$$A \rightarrow 10$$

$$B \rightarrow 15$$

$$C \rightarrow 7$$

$$q = 3$$



$$A = (9-3) + (18-12) + (25-21) = 6 + 6 + 4 = 16$$

$$= TT - (Arrival + Burst) = 26 - (0+10) = 16$$

$$B = (3-0) + (12-6) + (21-15) + (26-24) = 17$$

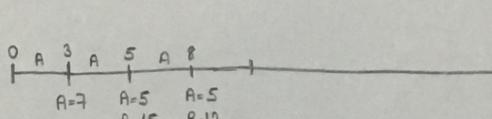
$$= TT - (Arrival + Burst) = 32 - (0+15) = 17$$

$$C = (6-0) + (15-9) + (24-18) = 18$$

$$= 25 - (0+7) = 18$$

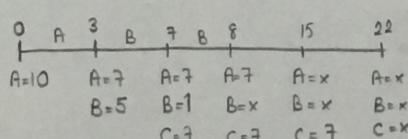
	Arrival
A → 10	0
B → 15	5
C → 7	18

$$q = 3$$

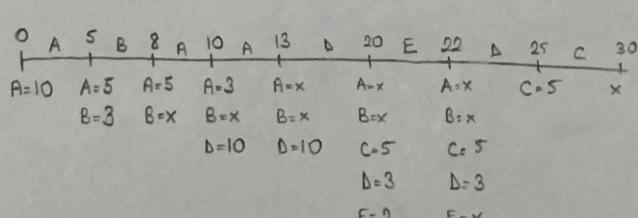


Shortest Remaining Time (SRT)

	Arrival T.	Burst
A →	0	10
B →	3	5
C →	17	7



	Arrival T.	Burst
A →	0	10
B →	3	5
C →	10	5
D →	10	10
E →	20	2



$$A = 13 - (0+10) = 3$$

$$B = 8 - (5+3) = 0$$

$$C = 30 - (20+5) = 5$$

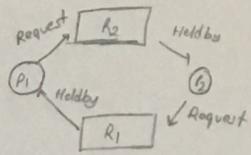
$$D = 25 - (10+10) = 5$$

$$E = 22 - (20+2) = 0$$

KDEADLOCK

18.10.2016
Salı
5

- ✗ Aynı anda aynı kaynığı kullanmaya çalışan birden çok process var.
- ✗ Deadlock engellemez fakat yok edilebilir.
- İşlem (Process)
- İşlemci (Thread)
- Starvation: Tek işlem vardır.
- ✗ Deadlock'in var olması iain 4 şartın da olması gereklidir. (Geffman)
 - 1-) Karsılıklı Dışlama (Mutual exclusion)
 - 2-) Çoklu Bağımsız İstekler (Multiple independent requests)
 - 3-) Başarılı İşlamsızlık (Nonpreemption)
 - 4-) Gemersel Bekleme (Circular wait.)

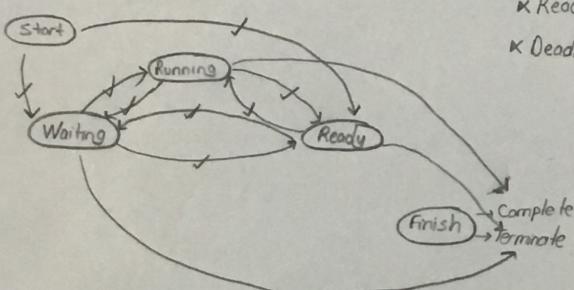


KLIVELOCK

- ✗ Her process'in dönerip, birinin galmaması gerekiyor

Bir işlem kaç durumda gálşabilir?

- ✗ Waiting'de kaynak bekliyor (Starvation)
- ✗ Ready'de sıra bekliyor, hazır durumda.
- ✗ Deadlock, Waiting anında olur.



"Şırınun oynusunu
cevaba yazdım"
"Akrobantıdır"
"can1, can2, can3"

Sleeping Barber

- ✗ Sayı Yerleştirme Algoritmaları
- ✗ SORU: Deadlock + Rüya Algoritması
- ✗ FIFO'ya bak. Orando yanlışlık var.
- ✗ Multiprocessing işlemi gereklidir.
- Bazı işletim sistemleri iain ...
- ✗ Alg. frame dolukton sonra ortaya çıkar
- ✗ con işletim sist. kullandığından
- ✗ Optimal son.