

Documentatie

Tema numarul 2

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1.Obiectiv

Obiectivul principal a fost sa proiectam si sa implementam un sistem de administrare a cozilor cu doua interfete grafice, una pentru introducerea datelor de simulare si alta pentru afisarea rezultatelor simularii.

Obiectivele secundare sunt : 1. Crearea a doua frame-uri , una pentru a afisa rezultatele, respectiv una pentru simulare.

2.Crearea unei clase client care sa retina datele referitoare la clienti: id, arrival time, service time precum si getter-ele si setter-ele corespunzatoare.

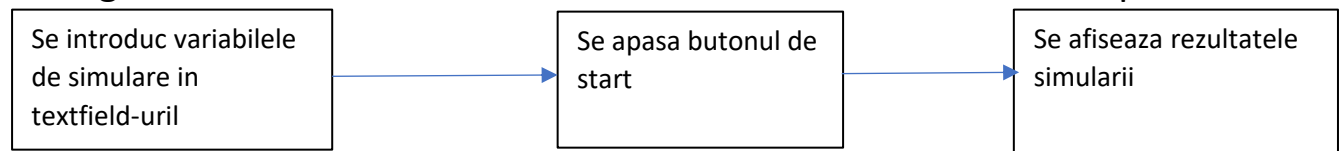
3.Crearea unei clase queue care sa contina un blocked queue pentru clienti, precum si functii pentru servirea clientilor, respectiv calcularea mediei de asteptare.

4.Crearea unei clase QueueMangement care se ocupa de administrarea cozilor

2.Analiza problemei, modelare, scenarii, cazuri de utilizare

Fiecare client este determinat de catre tupla (id,timp venire, timp de servire) si intra in simulare la timpul de venire , simularea incepand de la momentul 0. Dupa venire clientul va fi adaugat la coada la care acesta va fi servit cel mai repede . Modul in care am ales sa realizez

interfata pentru simulare este urmatorul: am creat 7 textfield-uri pentru fiecare variabila a simularii si jlabel-urile corespunzatoare. De asemenea, am folosit un buton de start pentru a incepe simularea. Interfata de afisare a rezultatelor contine doar un JTextArea. Scopul simularii este calcularea timpului mediu de asteptare, a orei de varf si a timpului mediu de servire. In acest sens, se utilizeaza o functie care adauga clientul in coada la care va fi servit cel mai repede.



3.Proiectare

Diagrame UML

Aplicatia a fost modelata dupa stilul MVC(Model-View-Controller). Astfel ca, clasele Controller si Utils apartin package-ului Controller, clasele ResultFrame si SimulationFrame apartin package-ului GUI, clasele Model, Queue si QueueManager apartin package-ului Model.

4.Implementare

Clasa Client

Contine attributele: id, serviceTime,arrivalTime , constructorul pentru client, precum getter-ele si setter-ele corespunzatoare.

Clasa Queue

Contine un BlockingQueue pentru a simula coziile pentru clienti, in acelasi timp avand si avantajele blockingqueue-lui de a oferi o implementare thread-safe sigura. Se mai foloseste si un hashset de clienti pentru a memora clientii carora li s-a calculat average-ul .

Clasa QueuesManager

Contine un arraylist de cozi si numarul de cozi, constructor, o functie care sa adauge clientul la coada cea mai scurta si o functie care calculeaza numarul total de clienti din toate coziile.

SimulationFrame

Contine codul corespunzator design-ului pentru interfata de simulare.

ResultFrame

Contine codul corespunzator design-ului pentru interfata de afisare a rezultatului.

Controller

Are rolul de a face legatura intre GUI si Model. In Controller are loc simularea, apelarea ascultatoarelor de actiune, calcularea timpului mediu de asteptare, a timpului de servire si a orei de varf.

5.Rezultate

Test 1

$N = 4$ $Q = 2$

$t_{simulation} MAX = 60$ seconds

$[t_{arrival} MIN , t_{arrival} MAX] = [2, 30]$

$[t_{service} MIN , t_{service} MAX] = [2, 4]$

Arrival time: 6 service time: 3id: 1

Arrival time: 24 service time: 3id: 2

Arrival time: 14 service time: 2id: 3

Arrival time: 19 service time: 4id: 4

At time 0 there are: in queue number 1

At time 0 there are: in queue number 2

At time 1 there are: in queue number 1

At time 1 there are: in queue number 2

At time 2 there are: in queue number 1

At time 2 there are: in queue number 2

At time 3 there are: in queue number 1

At time 3 there are: in queue number 2

At time 4 there are: in queue number 1

At time 4 there are: in queue number 2

At time 5 there are: in queue number 1

At time 5 there are: in queue number 2

At time 6 there are: Arrival time: 6 service time: 2id: 1

in queue number 1

At time 6 there are: in queue number 2

At time 7 there are: Arrival time: 6 service time: 1id: 1

in queue number 1

At time 7 there are: in queue number 2

At time 8 there are: in queue number 1

At time 8 there are: in queue number 2

At time 9 there are: in queue number 1

At time 9 there are: in queue number 2

At time 10 there are: in queue number 1

At time 10 there are: in queue number 2

At time 11 there are: in queue number 1

At time 11 there are: in queue number 2

At time 12 there are: in queue number 1

At time 12 there are: in queue number 2

At time 13 there are: in queue number 1

At time 13 there are: in queue number 2

At time 14 there are: Arrival time: 14 service time: 1id: 3
in queue number 1

At time 14 there are: in queue number 2

At time 15 there are: in queue number 1

At time 15 there are: in queue number 2

At time 16 there are: in queue number 1

At time 16 there are: in queue number 2

At time 17 there are: in queue number 1

At time 17 there are: in queue number 2

At time 18 there are: in queue number 1

At time 18 there are: in queue number 2

At time 19 there are: Arrival time: 19 service time: 3id: 4
in queue number 1

At time 19 there are: in queue number 2

At time 20 there are: Arrival time: 19 service time: 2id: 4
in queue number 1

At time 20 there are: in queue number 2

At time 21 there are: Arrival time: 19 service time: 1id: 4
in queue number 1

At time 21 there are: in queue number 2

At time 22 there are: in queue number 1

At time 22 there are: in queue number 2

At time 23 there are: in queue number 1

At time 23 there are: in queue number 2

At time 24 there are: Arrival time: 24 service time: 2id: 2
in queue number 1

At time 24 there are: in queue number 2

At time 25 there are: Arrival time: 24 service time: 1id: 2
in queue number 1

At time 25 there are: in queue number 2

At time 26 there are: in queue number 1

At time 26 there are: in queue number 2

At time 27 there are: in queue number 1

At time 27 there are: in queue number 2

At time 28 there are: in queue number 1

At time 28 there are: in queue number 2

At time 29 there are: in queue number 1

At time 29 there are: in queue number 2

At time 30 there are: in queue number 1

At time 30 there are: in queue number 2

At time 31 there are: in queue number 1

At time 31 there are: in queue number 2

At time 32 there are: in queue number 1

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At time 41 there are: in queue number 1

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At time 56 there are: in queue number 1

At time 56 there are: in queue number 2

At time 57 there are: in queue number 1

At time 57 there are: in queue number 2

At time 58 there are: in queue number 1

At time 58 there are: in queue number 2

At time 59 there are: in queue number 1

At time 59 there are: in queue number 2

At time 60 there are: in queue number 1

At time 60 there are: in queue number 2

Average waiting time: 0.0

Average service time: 3.0

Peak hour: 6

6.Concluzii

In concluzie, acest proiect m-a ajutat sa imi aprofundez cunostintele legate de stilul MVC si am invatat sa folosesc colectia BlockingQueue si functiile corespunzatoare .

7.Bibliografie

1.[Fundamental Programming Techniques \(dsrl.eu\)](https://dsrl.eu)