

Smalltalk Lecture 5

Assignment Project Exam Help

Add WeChat powcoder

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder



Assignment Project Exam Help

Node (helper class for Queue)

Add WeChat powcoder

Object subclass: #Node.

Assignment Project Exam Help

Node instanceVariableNames: 'data next'.

<https://powcoder.com>

Node extend [Add WeChat powcoder
data [^ data]
next [^ next]
data: d [data := d]
next: n [next := n]
]

Assignment Project Exam Help

Queue class and insert:

Add WeChat powcoder

Object subclass: #Queue.

Queue instanceVariableNames: 'front back'

Queue extend [
 insert: key [
 | p |
 p := Node new data: key.
 front isNil
 ifTrue: [front := p. back := p]
 ifFalse: [back next: p. back := p]
]
]

Assignment Project Exam Help

remove:

Add WeChat powcoder

```
Queue extend [
  remove [
    | key |
    front isNil ifTrue: [ ^ nil ].
    key := front data.
    front := front next.
    ^ key
  ]
]
```

Assignment Project Exam Help
"dequeue"
<https://powcoder.com>
Add WeChat powcoder
"automatic garbage collection"

Assignment Project Exam Help

display

Add WeChat powcoder

Queue extend [

display [

| p |

p := front.

[p notNil] while True

[Transcript display: p data; cr. p := p next]

]

]

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Assignment Project Exam Help

Client code

Add WeChat powcoder

q := Queue new.

q insert: 20; insert: 40; insert: 10; insert: 30.

q display.

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

20

40

10

30

5 timesRepeat:

[Transcript display: q remove; cr].

20

40

10

30

nil

Assignment Project Exam Help

do:

Add WeChat powcoder

```
Queue extend [  
  do: aBlock [  
    | p |  
    p := front.  
    [ p notNil ] whileTrue:  
      [ aBlock value: p data, p := p next ]  
  ]  
]
```

```
q := Queue new.  
q insert: 20; insert: 40; insert: 10; insert: 30.  
q do: [ :x | Transcript display: x; cr ].
```

20
40
10
30

Assignment Project Exam Help

collect:

Add WeChat powcoder

```
Queue extend [  
  collect: aBlock [ "map"  
    | q |  
    q := Queue new.  
    self do: [ :key | q insert: (aBlock value: key) ].  
    ^ q  
  ]  
]
```

```
r := q collect: [ :x | x*x ].  
r do: [ :x | Transcript display: x; cr ].
```

400
1600
100
900

Assignment Project Exam Help

select:

Add WeChat powcoder

```
Queue extend [  
  select: aBlock [ "filter"  
    | q |  
    q := Queue new.  
    self do: [ :key | (aBlock value: key)  
      ifTrue: [ q insert: key ] ].  
    ^ q  
  ]  
]
```

```
s := q select: [ :x | x>15 and: [x<35] ].  
s do: [ :x | Transcript display: x; cr ].
```

20

30

Assignment Project Exam Help

reject:

Add WeChat powcoder

Queue extend [

reject: aBlock [

| q |

q := Queue new.

self do: [:key | (aBlock value: key)

^ q

]

]

t := q reject: [:x | x>15 and: [x<35]].

t do: [:x | Transcript display: x; cr].

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

40

10

Assignment Project Exam Help

reject: (simpler version)

Add WeChat powcoder

Queue extend [Assignment Project Exam Help
reject: aBlock [
^ self select: [:x | (aBlock value: x) not]
]
]
]

u := q reject: [:x | x>15 and: [x<35]].
u do: [:x | Transcript display: x; cr].

40
10

Assignment Project Exam Help

inject: into:

Add WeChat powcoder

Queue extend [

inject: id into: aBlock ["fold-left"

| x |

Assignment Project Exam Help

x := id.

<https://powcoder.com>

self do: [:key | x := aBlock value: x value: key].

^ x

Add WeChat powcoder

]

]

Transcript display: (q inject: 0 into: [:a :b | a+b]); cr.

Transcript display: (q inject: 1 into: [:a :b | a*b]); cr.

100

240000

Assignment Project Exam Help

detect: ifNone:

Add WeChat powcoder

Queue extend [

detect: aBlock ifNone: defaultBlock [

self do: [:key | (aBlock value: key) ifTrue: [^ key]].

^ defaultBlock value

]

]

Transcript display: (q detect: [:x | x<15] ifNone: [99]); cr.

Transcript display: (q detect: [:x | x>25] ifNone: [99]); cr.

Transcript display: (q detect: [:x | x>50] ifNone: [99]); cr.

10

40

99

Assignment Project Exam Help

PriorityQueue subclass (version 1)

Add WeChat powcoder

Queue subclass: #PriorityQueue1.

PriorityQueue1 extend [

insert: key [Assignment Project Exam Help "maintain keys in ascending order"

| p |

<https://powcoder.com>
(front isNil or: [key < front data])

ifTrue: [front := Node new data: key; next: front. ^ self].

p := front.

[p next isNil or: [key < p next data]]

whileFalse: [p := p next].

p next: (Node new data: key; next: p next)

]

]

Assignment Project Exam Help
PriorityQueue1 client
Add WeChat powcoder

q := PriorityQueue1 new.

q insert: 20; insert: 40; insert: 10; insert: 30.

q display.

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

10

20

30

40

5 timesRepeat: [Transcript display: q remove; cr].

10

20

30

40

nil

Assignment Project Exam Help

PriorityQueue subclass (version 2) ...

Add WeChat powcoder

Queue subclass: #PriorityQueue2.

PriorityQueue2 extend [

remove [[Assignment Project Exam Help](https://powcoder.com) "remove minimum key"

| p key |

front isNil ifTrue: [^ nil].

p := front.

[Add WeChat powcoder](https://powcoder.com)

key := front data.

[p isNil] whileFalse: [

(p data < key) ifTrue: [key := p data].

p := p next

].

...

Assignment Project Exam Help

... continued

Add WeChat powcoder

```
PriorityQueue2 extend [  
  remove [ "remove minimum key"  
  ...  
  (key == front data) ifTrue: [ front := front next. ^ key ].  
  p := front.  
  [ key ~= p next data ] whileTrue: [ p := p next ].  
  p next: p next next.  
  ^ key  
]  
]
```

Assignment Project Exam Help
PriorityQueue2 client
Add WeChat powcoder

q := PriorityQueue2 new.

q insert: 20; insert: 40; insert: 10; insert: 30.

q display.

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

20

40

10

30

5 timesRepeat: [Transcript display: q remove; cr].

10

20

30

40

nil