Classes: Concepts, Context, & Identification

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Overview

- **Introduction**
- **The Park World**
- **The Role of the Requirements Engineer**
- **Examples to Be Done In Class or at Home** ☺

INTRODUCTION

Introduction -1

All your acquaintance with classes prior to this course has been as a device to implement information hiding and object orientation.

You have looked at them as documentation of code written in C++, Java, and possibly other languages.

Introduction -2

You may have even looked at class diagrams as an expression of the architecture of a program either to be built or that has been built out of classes.

You may have looked at class diagrams as a notation in which to play with the architecture of a program in order to arrive at the best architecture.

Introduction -3

However, the question remains, “How are class diagrams, and, indeed how are all of UML, used in requirements engineering to help arrive at a specification of requirements?”

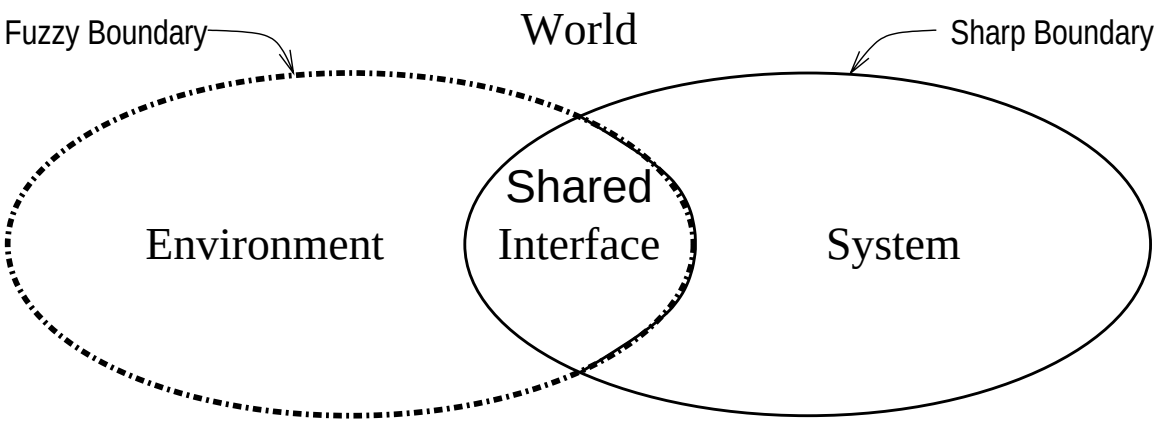
This lecture tries to answer this question by considering some examples of deriving a class diagram from a problem description.

THE PARK WORLD

Example 1: Turnstile

The city of Waterloo has decided to raise funds by instituting users fees for public parks. We need to implement a complete system of money collection, security, etc.

Dividing the World



The Environment is the part of the World that is affected by the System.

Turnstile Requirements

***Informal requirements*:Collect $1 fee from each human park user on entry to park (no fee to leave).**

- **Ensure that no one may enter park without paying.**
- **Ensure that anyone who has paid may enter park.**

Possible Solutions

***Solution #1*: Employ human fee collectors. Enforce security by instituting the Waterloo Park Militia, armed guards who make certain no one uses a park without paying a user fee.**

***Solution #2*: Use chain link fences for security, use turnstiles with automated coin collection. After some research, we find appropriate turnstile hardware, but it's brand new technology so we must create the embedded software system....**

The Park World -1

There is a barrier to enter a park. A person inserts a coin, the barrier unlocks, allowing the person to push the barrier and enter the park.

The Park World -2a

environment	**visitorS**
	does insert of coinS to CoinSlot
	detects unlocking of Barrier
	does push of Barrier
	coinS
	fence
	p~~ersonS~~

The Park World -2b

shared phenomena	**coinSlot**	**receives insert(denom)**
		receives inserted?()
		does addCoin(denom) to TurnstileSystem
	Barrier	**receives push()**
		receives unlock()
		receives inRotation?()
		receives lock() or locked?()
		does addVisitor() to TurnstileSystem

The Park World -2c

software system	**TurnstileSystem**

does inserted?() to CoinSlot
does inRotation?() to Barrier
does unlock() to Barrier
does lock() or locked?() to Barrier
receives addCoin(denom)
receives addVisitor()

The Park World -3

The software system and the environment interact via the shared phenomena, which may be both sensed and controlled by both the software system and the environment:

The Park World -4

- **The environment controls insertions of coins into coin slots.**
- **The software system senses coin insertion and then reacts by unlocking the barrier.**

The Park World -5

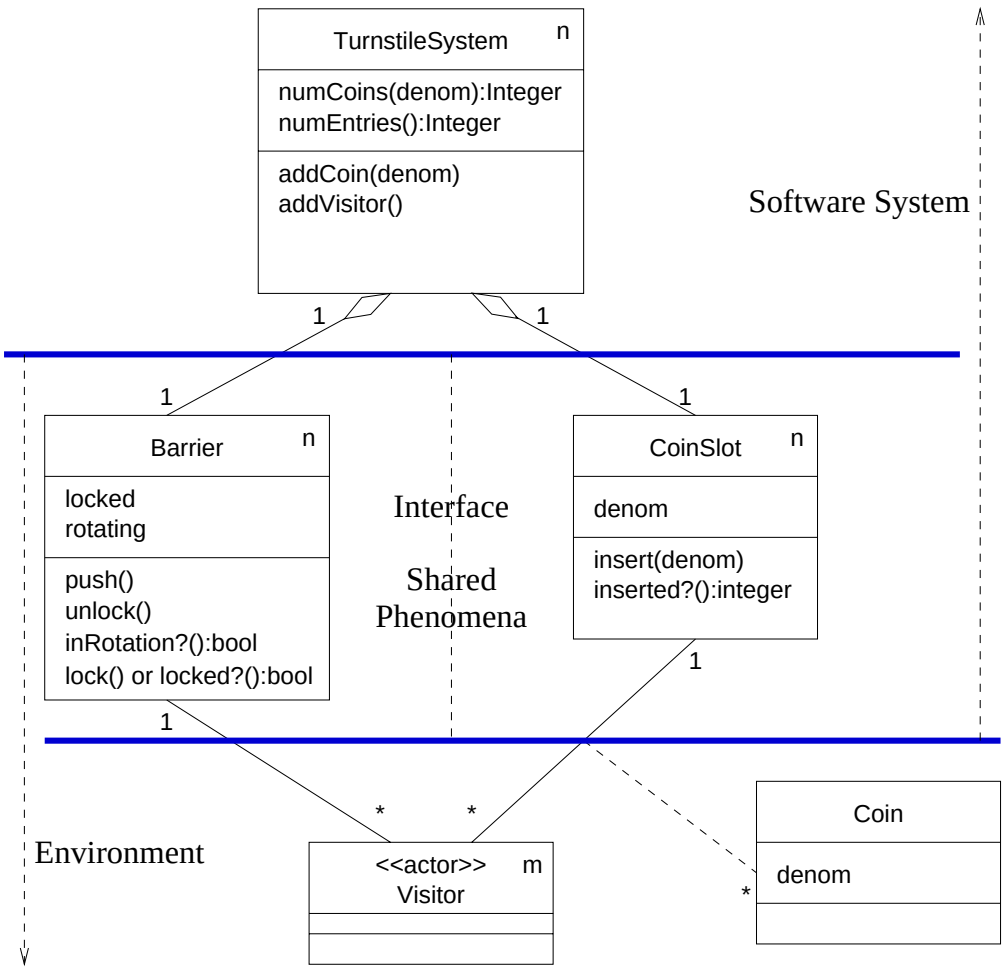
- **The environment senses that the barrier is unlocked and a person can rotate the barrier (to enter the park).**
- **The software system senses barrier rotation and eventually either locks the barrier, senses that the barrier has locked, or assumes that the barrier locks itself after rotation.**

The Park World -6

What locks and unlocks and what is pushed and is rotated is the barrier, and this barrier together with the coin slot form the turnstile. The barrier and the coin slot together are the phenomena shared between the turnstile software system and the visitor in the environment.

Accordingly, we may construct a class diagram.

Turnstile Class Diagram



Class Multiplicities

***** **arbitrary number ≥ 0, each independent of all others**

+ **arbitrary number > 0, each independent of all others**

n **arbitrary number ≥ 0, every “n” is the same**

0 **none**

1 **one**

2 **two**

…

Arc Multiplicities

In 

,

Each A Xes n Bs.

Each B is Xed by m As.

“Xes” is the verb expressing the L-to-R relationship of the arc.

“is Xed by” is the verb expressing the R-to-L the relationship of the arc.

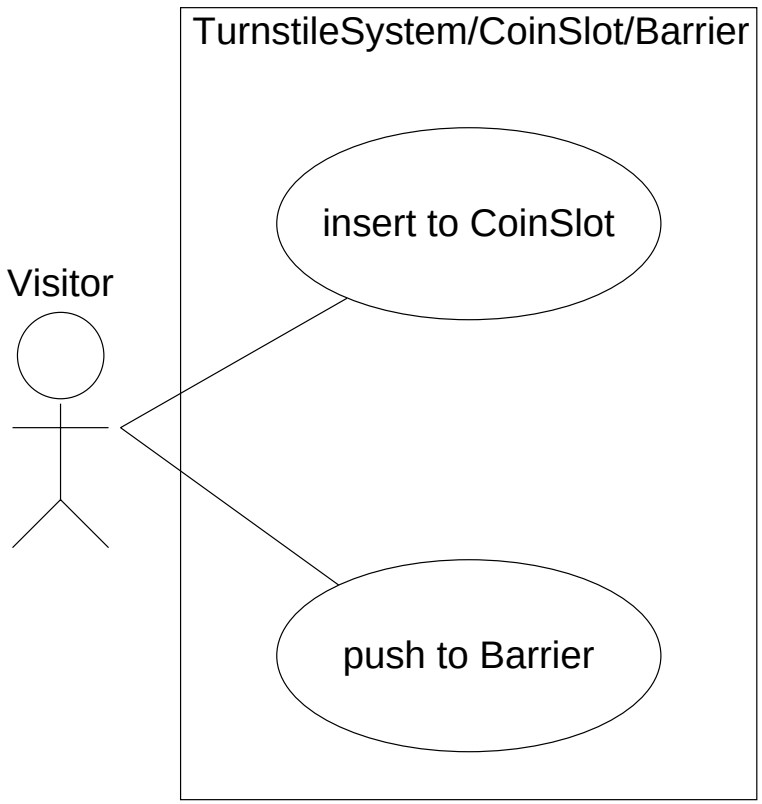
The Park World -7

We now identify the use cases as the operations in the Interface classes that are both

- **accessible to and**
- ***done* by**

the actors.

Turnstile Use Cases



THE ROLE OF THE REQUIREMENTS ENGINEER

Role of the REng -1

Please understand the role of the requirements engineer (REng).

E is often called in to work with problems that are totally new to em. The problem description uses vocabulary unfamiliar to em.

Role of the REng -2

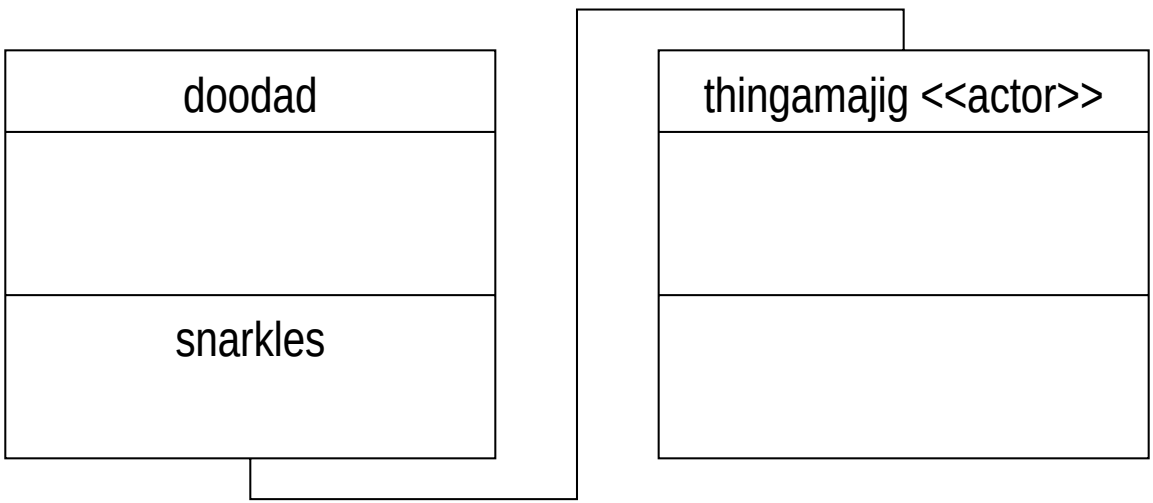
It is the job of the requirements engineer to begin to form a model of the described problem so that E can use the model to identify what E does not understand and to ask questions of the client.

Role of the REng -3

Very often this initial model is formed in ignorance. The requirements engineer identifies the nouns, verbs, adjectives, and adverbs of the problem description and uses them as the names of classes, operations, attributes, and nonfunctional requirements in the model formed in ignorance.

Encoding Ignorance

The thingamajig snarkles the doodad.



Role of the REng -4

That is, the requirements engineer is skilled enough in modeling that E can take the words of the problem description and put them in the right places in the model, so as to end up with an intelligible model, even though E does not understand the words.

EXAMPLES TO BE DONE IN CLASS OR AT HOME

Real World Examples

Now we consider how to build a necessarily incomplete model from the poor information you get from clients.

Example 2: Whenisgood.net

A Web app: http://whenisgood.net

Play with it!!!

Screenshots

When is Good

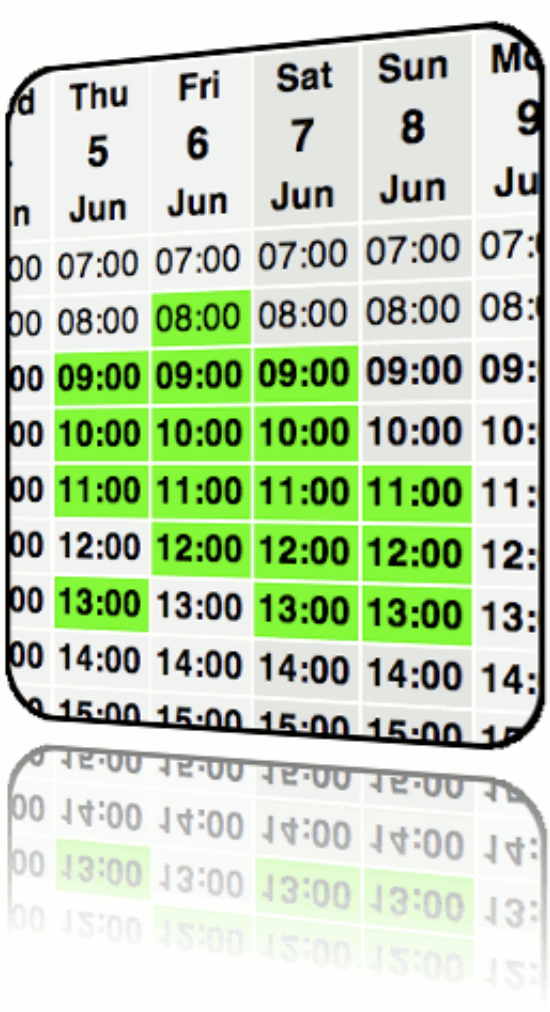
An easy way to find out when everyone is free for your next meeting or event.

1. Click the grid for all the times that are good for you - you get a link to email to your invitees.
2. They see your proposed times and click on when they are free.
3. You visit your results page and see when everyone can do.

No sign-up form. No password to choose. No fuss at all.

get started

login | get account | enter a results code | faq | terms | privacy | pricing



When is Good

English (United States)

15min | 30min | 60min | day

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Use timezones:

name of event

CREATE EVENT

SHOW OPTIONS

When is Good

15min | 30min | 60min | day

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Use timezones:

If everyone is in the same part of the world, you can ignore this option.

To use timezones, all you - and your invitees - need to do is make sure the dropdown shows the correct location. The system works everything else out.

name of event

CREATE EVENT

HI

View to: Oct 1, 2024

Show days: Sun Mon Tue Wed Thu Fri Sat

Show hours: 6:00 AM to 9:00 PM reset to defaults

Highlight hours: 9:00 AM to 4:00 PM reset to defaults

Invitation URL: http://whenisgood.net/ 4dinq4g

Top text: Below are the proposed time slots for this event. Paint over all that are good for you.

Duration: minutes

Hide dates:

When is Good

English (United States)

SuperDuperApp Group Meet

15min | 30min | 60min | day

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11am	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**	**11am**
30	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
12pm	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**	**12pm**
30	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
1pm	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**	**1pm**
30	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
2pm	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**	**2pm**
30	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
3pm	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**	**3pm**
30	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm	4pm
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm	5pm
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm	6pm
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm	7pm
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm	8pm
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Use timezones:

SuperDuperApp Group Meet

CREATE EVENT

HIDE OPTIONS

UPDATE GRID

View from: 2024-09-16

View to: 2024-09-20

Show days: Sun Mon Tue Wed Thu Fri Sat

Show hours: 6:00 AM to 9:00 PM reset to defaults

Highlight hours: 8:00 AM to 5:00 PM reset to defaults

Invitation URL: http://whenisgood.net/ 4dinq4g

Top text: Below are the proposed time slots for the group meeting. Paint over all that are good for you.

Duration: 60 minutes

Hide dates:

SuperDuperApp Group Meet

Sorry - we can't create your event just yet. You need to highlight the times that you want to propose. Click and paint the slots that you would like to suggest - they will turn green. As soon as you've got at least two slots selected, the 'create event' button will work.

15min | 30min | 60min | day

Mon	Tue	Wed	Thu	Fri
16 Sep	17 Sep	18 Sep	19 Sep	20 Sep
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

Use timezones: ☐

SuperDuperApp Group Meet | CREATE EVENT

HIDE OPTIONS

UPDATE GRID

View from: Sep 16, 2024

View to: Sep 20, 2024

Show days: Sun Mon Tue Wed Thu Fri Sat

☐ ☑ ☑ ☑ ☑ ☑ ☐

Show hours: 6:00 AM to 9:00 PM reset to defaults

Highlight hours: 8:00 AM to 5:00 PM reset to defaults

Invitation URL: http://whenisgood.net/ 4dinq4g

Top text: Below are the proposed time slots for the group meeting. Paint over all that are good for you.

Duration: 60 minutes

Hide dates: ☐

SuperDuperApp Group Meet

Sorry - we can't create your event just yet. You need to highlight the times that you want to propose. Click and paint the slots that you would like to suggest - they will turn green. As soon as you've got at least two slots selected, the 'create event' button will work.

15min | 30min | 60min | day

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

Use timezones: ☐

SuperDuperApp Group Meet | CREATE EVENT

HIDE OPTIONS

UPDATE GRID

View from: Sep 16, 2024

View to: Sep 20, 2024

Show days: Sun Mon Tue Wed Thu Fri Sat

☐ ☑ ☑ ☑ ☑ ☑ ☐

Show hours: 6:00 AM to 9:00 PM reset to defaults

Highlight hours: 8:00 AM to 5:00 PM reset to defaults

Invitation URL: http://whenisgood.net/ 4dinq4g

Top text: Below are the proposed time slots for the group meeting. Paint over all that are good for you.

Duration: 60 minutes

Hide dates: ☐

When is Good

15min | 30min | 60min | day

SuperDuperApp Group Meet

Mon	Tue	Wed	Thu	Fri
16 Sep	17 Sep	18 Sep	19 Sep	20 Sep
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

You are editing an existing event.

Use timezones:

SHOW OPTIONS

SuperDuperApp Group Meet

SAVE CHANGES

Nearly there. Write this code down somewhere ...

hxxhr2y

... without this you will not be able to see your results.

I HAVE SAVED THE RESULTS CODE

SuperDuperApp Group Meet

Success: your event has been created!

Send this link to your invitees ...

http://whenisgood.net/4dinq4g

Send me alerts when there is a response.

tweet this

This is where your results will appear ...

http://whenisgood.net/4dinq4g/results/hxxhr2y

And use this link to edit your event ...

http://whenisgood.net/4dinq4g/edit/hxxhr2y

SuperDuperApp Group Meet

Below are the proposed time slots for the group meeting. Paint over all that are good for you.

duration: 60 minutes

Mon	Tue	Wed	Thu	Fri
16 Sep	**17 Sep**	**18 Sep**	**19 Sep**	**20 Sep**
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
3:00 pm	3:00 pm	3:00 pm	3:00 pm	3:00 pm
3:30 pm	3:30 pm	3:30 pm	3:30 pm	3:30 pm
4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

Your name:

Comments:

SEND RESPONSE

SuperDuperApp Group Meet

Below are the proposed time slots for the group meeting. Paint over all that are good for you.

duration: 60 minutes

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
3:00 pm	3:00 pm	3:00 pm	3:00 pm	3:00 pm
3:30 pm	3:30 pm	3:30 pm	3:30 pm	3:30 pm
4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

Your name: Dan

Comments: If necessary, I could come 11:30-1

UPDATE RESPONSE

Thanks!

Update your response any time here:

http://whenisgood.net/4dinq4g/update/9ny579gn

☐ Email me this link to keep for later.

Want to set up your own event?

It's really easy to do, just click here to get started. Here's a quick video to show you how it's done...

Thanks for using **WhenIsGood**

SuperDuperApp Group Meet

Below are the proposed time slots for the group meeting. Paint over all that are good for you.

duration: 60 minutes

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
3:00 pm	3:00 pm	3:00 pm	3:00 pm	3:00 pm
3:30 pm	3:30 pm	3:30 pm	3:30 pm	3:30 pm
4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

Your name: Jack

Comments:

SEND RESPONSE

Thanks!

Update your response any time here:

http://whenisgood.net/4dinq4g/update/ttqxf525

☐ Email me this link to keep for later.

Want to set up your own event?

It's really easy to do, just click here to get started. Here's a quick video to show you how it's done...

Thanks for using **WhenIsGood**

Options

send more invites
add response
edit event

Responses

Jack

Dan

SuperDuperApp Group Meet

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
3:00 pm	3:00 pm	3:00 pm	3:00 pm	3:00 pm
3:30 pm	3:30 pm	3:30 pm	3:30 pm	3:30 pm
4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

how to use this page...

Options

send more invites
add response
edit event

Responses

Jack
Dan

Jack

Responded: 9/12/24 2:45 PM

- exclude this response
- permanently delete this response
- edit this response
- request update from respondent

SuperDuperApp Group Meet

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
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4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

how to use this page...

Options

send more invites
add response
edit event

Responses

Jack

Dan

Dan

Responded: 9/12/24 2:23 PM

"If necessary, I could come 11:30-1"

- exclude this response
- permanently delete this response
- edit this response
- request update from respondent

SuperDuperApp Group Meet

Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
7:00 am	7:00 am	7:00 am	7:00 am	7:00 am
7:30 am	7:30 am	7:30 am	7:30 am	7:30 am
8:00 am	8:00 am	8:00 am	8:00 am	8:00 am
8:30 am	8:30 am	8:30 am	8:30 am	8:30 am
9:00 am	9:00 am	9:00 am	9:00 am	9:00 am
9:30 am	9:30 am	9:30 am	9:30 am	9:30 am
10:00 am	10:00 am	10:00 am	10:00 am	10:00 am
10:30 am	10:30 am	10:30 am	10:30 am	10:30 am
11:00 am	11:00 am	11:00 am	11:00 am	11:00 am
11:30 am	11:30 am	11:30 am	11:30 am	11:30 am
12:00 pm	12:00 pm	12:00 pm	12:00 pm	12:00 pm
12:30 pm	12:30 pm	12:30 pm	12:30 pm	12:30 pm
1:00 pm	1:00 pm	1:00 pm	1:00 pm	1:00 pm
1:30 pm	1:30 pm	1:30 pm	1:30 pm	1:30 pm
2:00 pm	2:00 pm	2:00 pm	2:00 pm	2:00 pm
2:30 pm	2:30 pm	2:30 pm	2:30 pm	2:30 pm
3:00 pm	3:00 pm	3:00 pm	3:00 pm	3:00 pm
3:30 pm	3:30 pm	3:30 pm	3:30 pm	3:30 pm
4:00 pm	4:00 pm	4:00 pm	4:00 pm	4:00 pm
4:30 pm	4:30 pm	4:30 pm	4:30 pm	4:30 pm
5:00 pm	5:00 pm	5:00 pm	5:00 pm	5:00 pm
5:30 pm	5:30 pm	5:30 pm	5:30 pm	5:30 pm

how to use this page...

When is Good

15min | 30min | 60min | day

SuperDuperApp Group Meet

Mon	Tue	Wed	Thu	Fri
16 Sep	17 Sep	18 Sep	19 Sep	20 Sep
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

You are editing an existing event.

Use timezones:

SHOW OPTIONS

SuperDuperApp Group Meet

SAVE CHANGES

When is Good

SuperDuperApp Group Meet

15min | 30min | 60min | day

Mon	Tue	Wed	Thu	Fri
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

You are editing an existing event.

Use timezones:

SuperDuperApp Group Meet | SAVE CHANGES

HIDE OPTIONS

UPDATE GRID

View from: Sep 16, 2024

View to: Sep 20, 2024

Show days: Sun Mon Tue Wed Thu Fri Sat

Show hours: 6:00 AM to 9:00 PM reset to defaults

Highlight hours: 8:00 AM to 5:00 PM reset to defaults

Invitation URL: http://whenisgood.net/ 4dinq4g

Top text: Below are the proposed time slots for the group meeting. Paint over all that are good for you.

Duration: 60 minutes

Hide dates:

When is Good

SuperDuperApp Group Meet

15min | 30min | 60min | day

Mon	Tue	Wed	Thu	Fri
6am	6am	6am	6am	6am
30	30	30	30	30
7am	7am	7am	7am	7am
30	30	30	30	30
8am	8am	8am	8am	8am
30	30	30	30	30
9am	9am	9am	9am	9am
30	30	30	30	30
10am	10am	10am	10am	10am
30	30	30	30	30
11am	11am	11am	11am	11am
30	30	30	30	30
12pm	12pm	12pm	12pm	12pm
30	30	30	30	30
1pm	1pm	1pm	1pm	1pm
30	30	30	30	30
2pm	2pm	2pm	2pm	2pm
30	30	30	30	30
3pm	3pm	3pm	3pm	3pm
30	30	30	30	30
4pm	4pm	4pm	4pm	4pm
30	30	30	30	30
5pm	5pm	5pm	5pm	5pm
30	30	30	30	30
6pm	6pm	6pm	6pm	6pm
30	30	30	30	30
7pm	7pm	7pm	7pm	7pm
30	30	30	30	30
8pm	8pm	8pm	8pm	8pm
30	30	30	30	30

You are editing an existing event.

Use timezones:

SHOW OPTIONS

SuperDuperApp Group Meet

SAVE CHANGES

Whenisgood.net Nouns

Event

Grid = Calendar

Event Convenor

Event Attendee

Build the Model

Build the model on the board with the class's help!

First Draft

Final Draft

Bad Draft

What *IS wrong* with it?

Example 3: Car

Passenger Vehicle, a.k.a Car

Not normally considered a software system, although it certainly has a lot of software these days. ☺

First Draft

Another View of Car

Add actor, Mechanic, that can see the innards of the vehicle.

Left as an exercise for the interested student.

☺

Example 4: Classroom Podium

We now build a model of the podium system in the typical classroom at the University of Waterloo.

First, the nouns of the problem and the multiplicities, that can become classes in the model.

Classroom Podium -1

- **1 Nexus Client Computer**
- **1 Podium Control Panel**
- **1 Input Selector**
- **1 Output Selector**
- *** Jack**
- **1 Loud Speaker**
- **1 Podium Computer**
  - **1 Keyboard**
  - **1 Mouse**
  - **1 Screen**
  - **1 Trackpad**

Classroom Podium -1

1 Internet
*** Departmental Nexus Server**

1 Laptop
1 Sound Source
1 Video Source

Classroom Podium -2

* **Data Projector**
* **Video Screen**
* **Projection Screen**
* **Projection Screen Motor**
  - **1 On Button**
  - **1 Off Button**
  - **1 Up Button**
  - **1 Down Button**

Classroom Podium -3

1 Lecturer
*** Listener**

Discovery While Modeling

As often happens during the building of any model, a new noun was discovered.

To handle the fact that all Video Screens and Data Projectors were to receive and display the same image, a

1 Video Controller

is needed to receive the image that is to be shared with all Video Screens and Data Projectors.