Software Development Project Management

Developing a Software Development Project Management Plan for Dhaka Subway Systems Automated Ticket Issuing System.

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Table of Contents

Revision history page

Edition#	Edition Date	Description of Change	Version
01	August 8, 2020	Primary Phage	0.7
02	August 11, 2020	Requirement Collections	0.9
03	August 13, 2020	Choose the SDLC	1.0
04	August 17,2020	Complete SDLC & Start Quality Gate Documentation	1.1
05	August 19, 2020	List the tasks	1.2
06	August 22,2020	Update the status of tasks & cost	1.3
07	August 22, 2020	Generated WES tree	1.4
09	August 25,2020	Estimate Project by cocomo81	1.5
10	August 31,2020	Schedule the task	1.6
11	September 02,2020	Management and Controlling	1.7
12	September 03,2020	Did Risk Management	1.8
13	September 04, 2020	Find The list of deliverables	1.9
14	September 05, 2020	Do defect tracking system	1.10
15	September 07, 2020	Calculate Metrices of Project	1.11
16	September 08,2020	Do Post Mortem	1.12

Introduction

General specification

*Our Software Firm (**Datasoft, Inc**.) has been awarded a contract to develop software for automated ticket issuing system for Dhaka Subway Systems. An automated ticket issuing system sells subway tickets. Users select their destination, and input a credit card and a PIN (personal identification number) number. The subway ticket is issued and their credit card account charged with its cost. When the user presses the start button, a menu display of potential destinations is activated along with a message to the user to select a destination. Once a destination has been selected, users are requested to insert their credit card. Its validity is checked and the user is then requested to input a PIN number. When the credit transaction has been validated, the ticket is issued.*
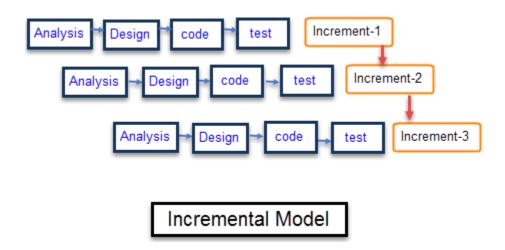
Software requirements

- *The software will support interface to touch screen monitors as well as keyboard interface.*
- *The software will support display of the list of incoming trains, their destinations and arrival and departure times, fare, expected travel time*
- *The software will support multiple ticket purchase simultaneously.*
- *The software will support limiting the number of tickets purchased at the same time. This privilege control will be done by the administrator access only.*
- *The software will support ticket cancellation before final confirmation of the purchase.*
- *The software will support purchased ticket cancellation by the administrator.*
- *The software will support credit card transaction and validation.*
- *The software will support transaction using bill(taka) /coin*
- *The software will support next and previous navigation during ticket purchase process.*
- *The software will support ticket availability information.*
- *The software will support information display via web.*
- *The software will support account management of Dhaka Subway Systems*
- *The software will use Oracle database server. Dhaka North City Corporation (DNCC) will be responsible for the license fees of Oracle database server.*

Major Functionalities

- *24/7 service*
- *Train arrival and departure time display*
- *Touch screen menu selection*
- *Source and destination selection*
- *Multiple ticket issue in one transaction*
- *Limit the number of ticket issue at the same time*
- *Cancellation of transactions any time during transaction*
- *Credit card transaction*
- *Coin/Taka recognition and acceptance*
- *Ticket availability information display*

Process Model

We can use Incremental Development Model which is a process of software development where requirements are broken down into multiple standalone modules of software development cycle. Incremental development is done in steps from analysis design, implementation, testing/verification, maintenance. Each iteration passes through the requirements, design, coding and testing phases. And each subsequent release of the system adds function to the previous release until all designed functionality has been implemented.

Incremental Model

The system is put into production when the first increment is delivered. The first increment is often a core product where the basic requirements are addressed, and

supplementary features are added in the next increments. Once the core product is analyzed by the client, there is plan development for the next increment.

We have to deliver our project as soon as possible with good quality. Then we can get enough time to get much feedback from the users. By getting feedbacks, we can do better the system. That's why we are choosing an agile model. It has a time boundary of 2-6 weeks. In that boundary, we can deliver our first incremental product to the users. So, for our project the usage of incremental model will be good for us.

Quality gate

The development phase has just been completed, the quality gate concept will kick in by means of a formal meeting, which is held with individual members of the project. At this stage, the examination of the project would typically encompass the following:

- *Code review: The senior designer will concentrate on acceptable coding techniques. The software design will be verified against the coding to identify any coding errors. Upon successful completion of the code review, the reviewing party will indicate required changes and corrections.*
- *Ops review: The project manager will work with the support or operational staff to review all support tasks needed to support the dev environment. For instance, the ops review will ensure that the necessary backup and restore procedures are in place, discs are available, escalation procedures have been created, etc.*
- *Sponsor review: The project manager will review the overall project performance with the sponsor. This review will determine the status of project costs and schedule and whether the scope is still accurate.*
- *Test review: The test lead and representatives from QA will attend the test review to see if all builds were tested correctly and make sure that all relevant questions have been posed to the development team.*

Once these meetings have been held and all the questions answered and accounted for, the quality gate review team reports to the stakeholders that the project has signed off on all relevant items for that particular phase and that the project may proceed to the next phase.

List of tasks

Design	Coding	Testing
Touch screen monitor and keyboard design	Touch screen monitor and keyboard design	Unit testing
Train arrived and departure time display	Train arrived and departure time display	
Multiple ticket purchase simulation	Multiple ticket purchase simulation	Intregation testing
Limiting the number of tickets purchased at the same time	Limiting the number of tickets purchased at the same time	
Ticket cancellation before final confirm action of the purchase	Ticket cancellation before final confirm action of the purchase	System Intregation Testing
Ticket cancellation before final confirm action of the purchase	Purchased ticket cancellation by the administrator	
Credit card transaction and validation	Credit card transaction and validation	Functional Testing
Transaction using bill (taka)/coin	Transaction using bill (taka)/coin	
Navigation during ticket purchase process	Navigation during ticket purchase process	Go live testing
Ticket availability information	Ticket availability information	
Information disply via web	Information disply via web	
Account management of org	Account management of org	

Estimation for each task

We have used COCOMO81 to estimate for each task. And because of mixed or average level experience among our developers we have decided to declare our project as a semi-detached project.

For semi-detached project the value of k, c, t will differ from others.

Here, effort = c x (size) ^{k}

- *[note: effort is measured in pm ('person-months')*

  c and k are constants that depend on the type of system: organic, semidetached, embedded.

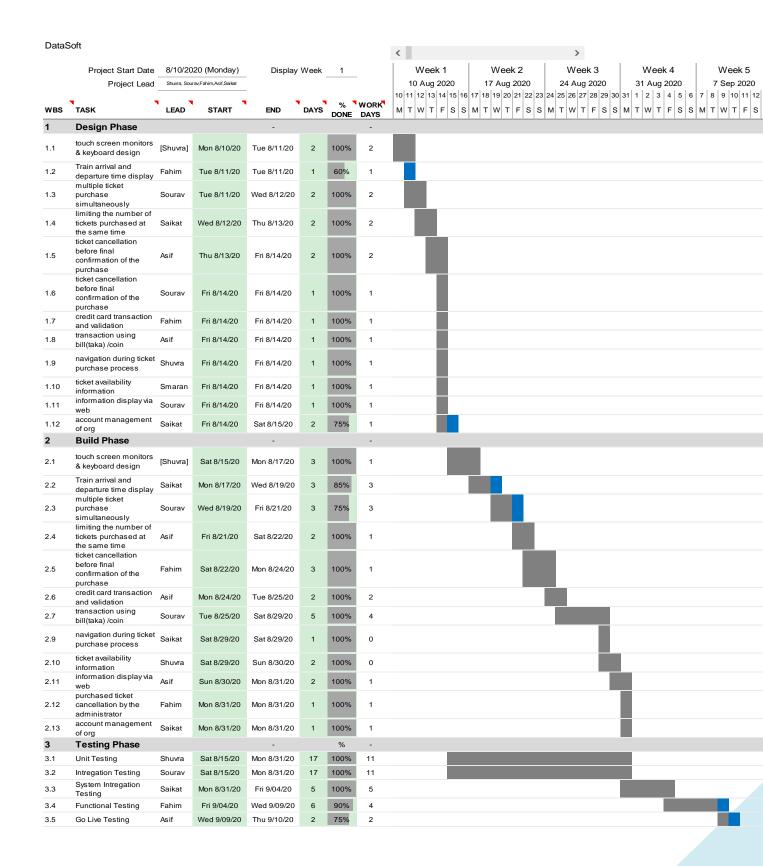 *Size is measured in "KDSI" (Thousands of delivered source code instructions)*

Here, our system is semidetached. So, the value of c=3.0, k=1.12 and t=0.35
So, Development Time = 2.5 x (effort) ^{t}
And, Required Number of people = effort/Development Time.
We have put those value in excel sheet to calculate all the task together.

Task No.		Task Description	size(KDMS)	Effort= 3*((size/1000)^1.1	Development Time=2.5*(effort^0	Required Number of People =
1		touch screen monitors & keyboard	12000	48.50698152	9.726833823	4.98692405
2		Train arrival and departure time display	11000	44.00287595	9.400660755	4.680827986
3		multiple ticket purchase simultaneously	9000	35.14575403	8.689514485	4.044616542
4		imiting the number of tickets purchased at the s	7600	29.08254964	8.132262262	3.576194262
5		cket cancellation before final confirmation of the	1200	3.679630841	3.944314138	0.932894976
6		purchased ticket cancellation by the adminis	3476	12.10962222	5.98460811	2.023461184
7		credit card transaction and validation	3000	10.2682648	5.64890121	1.817745509
8		transaction using bill(taka) /coin	2290	7.588169004	5.081453514	1.493306784
9		navigation during ticket purchase proces	3400	11.81347433	5.932970423	1.991156787
10		ticket availability information	2367	7.874505734	5.147758507	1.529696027
11		information display via web	35000	160.87089	14.79813964	10.87102121
12		account management of org	1200	3.679630841	3.944314138	0.932894976

Schedule the tasks

DataSoft

	Project Start Date	8/10/2020 (Monday)		Display Week	1
	Project Lead	Shuvra, Sourav,Fahim,Asif,Saikat			

WBS	TASK	LEAD	START	END	DAYS	% DONE	WORK DAYS
1	**Design Phase**			-		-	
1.1	touch screen monitors & keyboard design	[Shuvra]	Mon 8/10/20	Tue 8/11/20	2	100%	2
1.2	Train arrival and departure time display	Fahim	Tue 8/11/20	Tue 8/11/20	1	60%	1
1.3	multiple ticket purchase simultaneously	Sourav	Tue 8/11/20	Wed 8/12/20	2	100%	2
1.4	limiting the number of tickets purchased at the same time	Saikat	Wed 8/12/20	Thu 8/13/20	2	100%	2
1.5	ticket cancellation before final confirmation of the purchase	Asif	Thu 8/13/20	Fri 8/14/20	2	100%	2
1.6	ticket cancellation before final confirmation of the purchase	Sourav	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.7	credit card transaction and validation	Fahim	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.8	transaction using bill(taka) /coin	Asif	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.9	navigation during ticket purchase process	Shuvra	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.10	ticket availability information	Smaran	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.11	information display via web	Sourav	Fri 8/14/20	Fri 8/14/20	1	100%	1
1.12	account management of org	Saikat	Fri 8/14/20	Sat 8/15/20	2	75%	1
2	**Build Phase**			-		-	
2.1	touch screen monitors & keyboard design	[Shuvra]	Sat 8/15/20	Mon 8/17/20	3	100%	1
2.2	Train arrival and departure time display	Saikat	Mon 8/17/20	Wed 8/19/20	3	85%	3
2.3	multiple ticket purchase simultaneously	Sourav	Wed 8/19/20	Fri 8/21/20	3	75%	3
2.4	limiting the number of tickets purchased at the same time	Asif	Fri 8/21/20	Sat 8/22/20	2	100%	1
2.5	ticket cancellation before final confirmation of the purchase	Fahim	Sat 8/22/20	Mon 8/24/20	3	100%	1
2.6	credit card transaction and validation	Asif	Mon 8/24/20	Tue 8/25/20	2	100%	2
2.7	transaction using bill(taka) /coin	Sourav	Tue 8/25/20	Sat 8/29/20	5	100%	4
2.9	navigation during ticket purchase process	Saikat	Sat 8/29/20	Sat 8/29/20	1	100%	0
2.10	ticket availability information	Shuvra	Sat 8/29/20	Sun 8/30/20	2	100%	0
2.11	information display via web	Asif	Sun 8/30/20	Mon 8/31/20	2	100%	1
2.12	purchased ticket cancellation by the administrator	Fahim	Mon 8/31/20	Mon 8/31/20	1	100%	1
2.13	account management of org	Saikat	Mon 8/31/20	Mon 8/31/20	1	100%	1
3	**Testing Phase**			-		%	-
3.1	Unit Testing	Shuvra	Sat 8/15/20	Mon 8/31/20	17	100%	11
3.2	Intregation Testing	Sourav	Sat 8/15/20	Mon 8/31/20	17	100%	11
3.3	System Intregation Testing	Saikat	Mon 8/31/20	Fri 9/04/20	5	100%	5
3.4	Functional Testing	Fahim	Fri 9/04/20	Wed 9/09/20	6	90%	4
3.5	Go Live Testing	Asif	Wed 9/09/20	Thu 9/10/20	2	75%	2

Milestones

Milestone in a project is to measure the progress of a project and at the same time when it is running towards its main goal. In milestone there is no duration only a fixed date is available.

Milestones make it easier to keep projects on track by calling out major events, dates, decisions, and deliverables. Here are a few examples of project milestones:

- Start and end dates for project phases
- Key deliveries
- Client and stakeholder approvals
- Important meetings and presentations
- Key dates or outages that may impact your timeline

Here are the milestones of our project.

	A	B	C	D	E	F
1	Milestone Description	Est. Date	Actual Date	Actions	Review Date	
2	Plan the project	10/8/2020	14/08/2020	Complete design documentation	15/08/2020	
3	Create Prototype	12/8/2020	14/08/2020	Choose Software and SDLC to develop the system	15/08/2020	
4	Create System	25/08/2020	31/08/2020	Write Code	1/9/2020	
5	Test System	5/9/2020	9/9/2020	Test the system	15/9/2020	

Staffing Plan

Task No.		Task Description		Responsible	Start Date	Estimated Completion	
1		System Design Phase					
1.1		touch screen monitors & keyboard design		Architect	10/8/2020	1 day	
1.2		Train arrival and departure time display		Architect	11/8/2020	1 day	
1.3		multiple ticket purchase simultaneously		Architect	11/8/2020	1 day	
1.4		limiting the number of tickets purchased at the same time		Architect	12/8/2020	1 day	
1.5		ticket cancellation before final confirmation of the purchase		Architect	13/8/2020	1 day	
1.6		purchased ticket cancellation by the administrator		Architect	14/8/2020	1 day	
1.7		credit card transaction and validation		Architect	14/8/2020	1 day	
1.8		transaction using bill(taka) /coin		Architect	14/8/2020	1 day	
1.9		navigation during ticket purchase process		Architect	14/8/2020	1 day	
1.1		ticket availability information		Architect	14/8/2020	1 day	
1.11		information display via web		Architect	14/8/2020	1 day	
1.12		account management of org		Architect	14/8/2020	1 day	
2		System Build Phase					
2.1		touch screen monitors & keyboard		Dev Team	15/8/2020	2 day	
2.2		Train arrival and departure time display		Dev Team	17/8/2020	2 day	
2.3		multiple ticket purchase simultaneously		Dev Team	19/8/2020	2 day	
2.4		limiting the number of tickets purchased at the same time		Dev Team	21/8/2020	2 day	
2.5		ticket cancellation before final confirmation of the purchase		Dev Team	22/8/2020	1 day	
2.6		purchased ticket cancellation by the administrator		Dev Team	24/8/2020	2 day	
2.7		credit card transaction and validation		Dev Team	25/8/2020	1 day	
2.8		transaction using bill(taka) /coin		Dev Team	29/8/2020	4 day	
2.9		navigation during ticket purchase process		Dev Team	29/8/2020	1 day	
2.1		ticket availability information		Dev Team	30/8/2020	2 days	
2.11		information display via web		Dev Team	31/8/2020	2 days	
2.12		account management of org		Dev Team	31/8/2020	1 day	
3		Testing Phase					
3.1		Unit Testing		QA	15/8/2020	15 days	
3.2		Intregated Testing		QA	15/8/2020	15 days	
3.3		System Intregation Testing		QA	31/8/2020	5 days	
3.4		Functional Testing		SME	4/9/2020	5 days	
3.5		Go Live Testing		SME	9/9/2020	2 days	

Monitoring and Controlling

We can follow some steps for monitoring and controlling our project:

Measurement monitoring:
The regular monitoring of the measurement is very important. We have to check if the project work is being done in proper time and budget.

Performance Monitoring:
Check the project performance regularly and send the report to the stakeholders.

Quality control:
The quality control is very important for a successful project. Because if our project fails to meet the expectations of the customers and requirements of the

clients and the project fails to be completed in budget, then it will be considered as a failure project.

Schedule Control:
The schedule control is must for on time delivery. Our schedule control group prepares a plan for the project work schedule such a way that the project cannot be delayed even if there are any changes in requirements or any type of problem occurs in the project.

Cost Control:
Our finance analyst group manages the cost control. They estimate the cost and monitor the project cost baseline is good maintain the quality. And they also prepare the plan of the cost occurred for requirements changing.

Risk Management

Some Major risks we have determined for this software:
1. **Late delivery of software**
   This is very common risk for software projects, because we cannot estimate the accurate delivery time of a software project. But we have to keep our commitment as much as possible. So that we have to make sure everyone is working properly. We have to make sure the team members don't lose motivation for work. They have to do some extra work if needed. So, we have to make them feel good for working by rewarding them.
2. **Changes in requirements**
   Requirement changing is a big problem for this type of project. Because sudden change of any requirement can be a reason of late delivery of the software. We may have to change a lot of things for a small change. So, we have to be more careful while collecting the requirements.
3. **Poor coding**
   If the coding is not up to mark, then we will have to face problem later. We have to maintain the standard coding which is understandable to all developers so that while re-writing the codes it doesn't take extra time to

understand and easily re-writeable. It would be easier for future updates of the software.

4. **Budgeting**

Budget estimation is very important. If we run of out budget or the project becomes more costly than the estimation, we will be in a trouble. Because the client might not agree to extend their budget later. So, we have to be more careful while estimating the budget and we have to use our previous experience for this estimation.

List of Deliverables

Task No.		Task Description		Task Status	Start Date	Estimated Completion	
1		*System Design Phase*					
1.1		touch screen monitors & keyboard design		Complete	10/8/2020	1 day	
1.2		Train arrival and departure time display		In Progress	11/8/2020	1 day	
1.3		multiple ticket purchase simultaneously		Assigned	11/8/2020	1 day	
1.4		limiting the number of tickets purchased at the same time		Complete	12/8/2020	1 day	
1.5		ticket cancellation before final confirmation of the purchase		Complete	13/8/2020	1 day	
1.6		purchased ticket cancellation by the administrator		Complete	14/8/2020	1 day	
1.7		credit card transaction and validation		Complete	14/8/2020	1 day	
1.8		transaction using bill(taka) /coin		Complete	14/8/2020	1 day	
1.9		navigation during ticket purchase process		Complete	14/8/2020	1 day	
1.1		ticket availability information		Complete	14/8/2020	1 day	
1.11		information display via web		Complete	14/8/2020	1 day	
1.12		account management of org		Late	14/8/2020	1 day	
2		*System Build Phase*					
2.1		touch screen monitors & keyboard		Complete	15/8/2020	2 day	
2.2		Train arrival and departure time display		In Progress	17/8/2020	2 day	
2.3		multiple ticket purchase simultaneously		In Progress	19/8/2020	2 day	
2.4		limiting the number of tickets purchased at the same time		Complete	21/8/2020	2 day	
2.5		ticket cancellation before final confirmation of the purchase		Complete	22/8/2020	1 day	
2.6		purchased ticket cancellation by the administrator		Complete	24/8/2020	2 day	
2.7		credit card transaction and validation		Complete	25/8/2020	1 day	
2.8		transaction using bill(taka) /coin		Complete	29/8/2020	4 day	
2.9		navigation during ticket purchase process		Complete	29/8/2020	1 day	
2.1		ticket availability information		Complete	30/8/2020	2 days	
2.11		information display via web		Complete	31/8/2020	2 days	
2.12		account management of org		Complete	31/8/2020	1 day	
3		*Testing Phase*					
3.1		Unit Testing		Complete	15/8/2020	15 days	
3.2		Intregated Testing		Complete	15/8/2020	15 days	
3.3		System Intregation Testing		Complete	31/8/2020	5 days	
3.4		Functional Testing		In Progress	4/9/2020	5 days	
3.5		Go Live Testing		In Progress	9/9/2020	2 days	

Defect Tracking Process

Defect Tracking Log

Defect No.	Date Created	Created By	Defect Description	Lifecycle Phase	Priority	Owner	Assignee
1	01/09/20	Shuvra	24/7 service is not working. Takes some time everyday to update system	Testing	Medium	Dev Team	01/09
2	02/09/20	Saikat	arrival and departure wrong time display	Development	High	Dev Team	02/09
3	02/09/20	Asif	Touch screen menu selection. Menu icon is not correct	Design	Medium	Architect	02/09
4	03/09/20	Sourav	destination selected location not showing exactly	Development	Medium	Dev Team	03/09
5	04/09/20	Farhan	Limit the number of ticket issue at the same time	Development	High	Dev Team	04/09
6	04/09/20	Shuvra	Can't cancellation of transactions any time during transaction	Design	Medium	Architect	05/09
7	05/09/20	Farhan	Showing wrong info on ticket in credit card transaction	Development	High	Dev Team	05/09
8	05/09/20	Saikat	Coin is not recognitined	Development	High	Dev Team	05/09
9	06/09/20	Asif	Showing wrong info on ticket availability information display	Development	High	Dev Team	06/09
10	07/09/20	Sourav	System crashed frequently	Post-Deployment	High	QA	07/09
11	08/09/20	Shuvra	User's are not used to with the system	Documentation and Training	Low	Architect	08/09
12	09/09/20	Shuvra	Touch screen freeze for certain time	Post-Deployment	High	QA	09/09

Metrics
Project Duration:

- *Total Days: 32 days (4-5 weeks)*
- *Project Work Days: 30 days (4-5 weeks)*
- *Change Orders Days: 2 days*

Size:

- *Function Points: 671.96 fp*

15

- *Lines of Code: 32073 loc*

Ratios:

- *Code Density: 47.73 loc/fp*
- *Daily Productivity: 20.998 fp/day*

Return on Investment:

- *Cost: 30 days * 8hr/days * $32/hr * 50 people = $384,000*
- *Breakeven: @ sales price $192,000/yr;*
- *ROI Projection: 2 years – Breakeven*

    3 years – 50% ROI each year thereafter assuming contracts renewed.

Postmortem

Category	Questions	Yes/no
Project Planning	Product concept was appropriate to Business Objectives	Yes
	Project Plan and Schedule were well-documented, with appropriate structure and detail	No
	Tasks were defined adequately	Yes
	Stakeholders had appropriate input into the project planning process	Yes
	Requirements were documented clearly	Yes
	Specifications were clear and well-documented	Yes
	Project budget was well defined	Yes
	Stakeholders had easy access to Project Plan and Schedule	No
Project Execution	Project stuck to its original goals	Yes
	Project baselines (Scope, Time, Cost, Quality) were well-managed	Yes
	Design changes were well-controlled	Yes
	Stakeholders were satisfied with the information they received	Yes
	The project had adequate Quality Control	Yes
	Requirements – specifications – Test Plan were well-managed (e.g., Requirements Management System was used)	Yes
Project Team	Project Manager was effective	Yes
	Project Team was properly organized and staffed	Yes
	Project team worked effectively on project goals	Yes
	There was good communication within the Project Team	Yes
Overall	Initial cost and schedule estimates were accurate	Yes
	Product was delivered within amended schedule	Yes
	Technology chosen was appropriate	Yes
	Business Objectives were met	Yes
	Project Objectives were met	Yes
	Customer was satisfied with the product	Yes
	The project was a technological success	Yes

References

1. PMI ORGANIZATION

2. Project Management Body of Knowledge

   sixth edition

   by Project Management Institute