Innovative Teaching and Learning Practices

Innovative Teaching Approaches in Operating System

Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: Operating System [IT3221]
Semester/Year: 2022-23 (Sem1)

Course / Domain	Innovation Adopted in Teaching	Topics	Objectives
Operating System	Real life analogy	Job Scheduler, Deadlock	To understand how job scheduling is done And deadlock
	Role Play	Scheduling techniques,	Understanding of different scheduling algorithms
	Online quiz platform like Kahoot	Entire syllabus	To check understanding of OS and its functioanlities,Linux commands,shell scripting

Analogy with real life examples: Students should understand concept of deadlock
1) Statement of clear Goal: Students should understand concept of deadlock
2) Description of Innovative method :
Example 1: I have a five-year-old son and a three-year-old daughter. Both want to do the same colouring-in book.
The daughter grabs the pencils while the son grabs the book. Neither will relinquish what they have until they get the other.
That's deadlock. It doesn't get any simpler than that.
Your processes (or children) are stuck waiting for each other and will continue waiting indefinitely until some other superior process (like Dad) comes in and breaks the deadlock.

At least with the children, you can (sometimes) get one of them to see reason and relinquish their lock. This is not usually possible with computers since the processes are not doing *anything* except waiting for that resource (although sometimes children enter this state as well).

Following one rule will guarantee that deadlock cannot occur:

- Have *all* threads of execution allocate resources in the same order.

Following some extra rules will make your threads less likely to slow each other down but keep in mind that the above rule should take precedence over all others:

- Allocate resources only when you need them.

Release them as soon as you're finished with them.

2**) Example 2 of traffic signal:**
i) Bridge traffic can only be in one direction

ii) Each entrance of a bridge can be viewed as a resource

iii) If a deadlock occurs, it can be resolved if one car backs up (preempt resources and rollback)

iv) Several cars may have to be backed up if a deadlock occurs

v) Starvation is possible

3) Example 3:
Boss said to secretary: For a week we will go abroad, so make arrangement.

Secretary make call to Husband: For a week my boss and I will be going abroad, you look after yourself.

Husband make call to secret lover: My wife is going abroad for a week, so let's spend the week together.

Secret lover make call to small boy whom she is giving private tuition: I have work for a week, so you need not come for class.

Small boy make call to his grandfather: Grandpa, for a week I don't have class 'coz my teacher is busy. Let's spend the week together.

Grandpa make call to his secretary: This week I am spending my time with my grandson. We cannot attend that meeting.

Secretary make call to her husband: This week my boss has some work, we cancelled our trip.

Husband make call to secret lover: We cannot spend this week together, my wife has cancelled her trip.

Secret lover make call to small boy whom she is giving private tution: This week we will have class as usual.

Small boy make call to his grandfather: Grandpa, my teacher said this week I have to attend class. Sorry I can't give you company.

Grandpa make call to his secretary: Don't worry this week we will attend that meeting, so make arrangement.

4) "If you want to earn money, you need money"
5) "If you want to get job you need experience, without experience you cannot get job"

4) Outcome of the Activity which lead in attaining the Course Outcomes : The methods used proved overall valuable in improving student understanding of basics of deadlock as well as CO1-PO1 attainment.

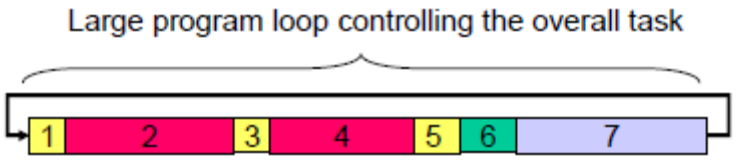
Analogy with real life examples: Job scheduling and components involved
1) Statement of clear Goal: Students should understand the process of Job scheduling and

components involved
2) Description of Innovative method :
Example 1:
Consider a scenario at a restaurant. Different parties of people are in line to be seated. The host/ess, or the operating systems long-term scheduler, sits each down, as tables of different sizes become available. Once seated (in the ready queue) the patrons are waiting to be served by the waiter or waitress (the CPU). The CPU will take their order (execute) after first offering the menu, water, and drinks being interrupted throughout. The waiter or waitress can serve only one table at a time. Other tables are then waiting for the CPU/waiter (ready queue) or waiting for I/O (food, drinks). Once a party finishes eating, the host/ess (terminator part of the operating systems) takes their money and greets them farewell (termination). It seems to be faster to have smaller parties with smaller demand for food (I/o-bound jobs versus CPU-bound jobs).

Example 2:
In daily life we are doing many things repeatedly and concurrently, for example:

- Cooking food
- Making the dish
- Bicycling to work
- Listening to radio
- Talking with friends
- Sleeping
- Etc.

• We switch our attention between many such tasks and give them varying priority



Simple monolith approach to control
Large program loop controlling the overall task Part 1, 3 and 5 are task instances of the same type activated three times in a main period .
Part 2 and 4 is the same task preempted by task 3.
Part 6 may depend on the result from task 4.
Program and part state info may be kept in global variables

4)Outcome of the Activity which lead in attaining the Course Outcomes: The methods used proved overall valuable in improving student understanding of basics of job scheduler as well as CO1-PO1 attainment.

Description of the Practice : Role play is ased to explain CPU scheduling

Scheduling techniques

Link to give Feedback: https://forms.gle/ws3mTksmrQ3yKphv8

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Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: Operating System [IT3221]
Semester/Year: 2023-24 (Sem1)

Class:TY(IT)

Objective of the Practice: Page replacement algorithms are essential components of operating systems that manage memory efficiently, particularly when the physical memory (RAM) is full. Explain working of FIFO,LRU and Optimal page replacement algorithm and check performance analysis of it based on page faults.

Description of the Practice : Page replacement algorithms using Role Play

Link to give Feedback: https://forms.gle/LHnbqphEUidgZ69XA

Innovative Teaching and Learning Practices

Innovative Teaching Approaches in PRINCIPLES OF PROGRAMMING LANGUAGES

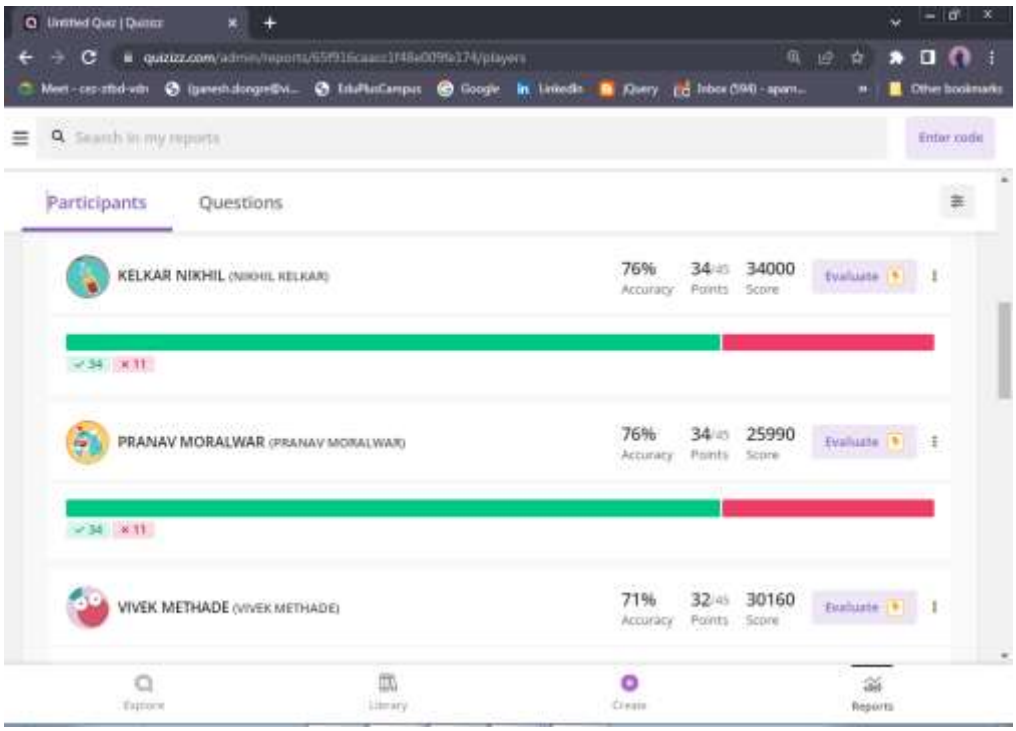
Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: PRINCIPLES OF PROGRAMMING LANGUAGES **(**IP1002)

Semester/Year: 2023-24 (Sem2)

Class:FY

Objective of the Practice : To check understanding of Procedure based Programming and Object Based Programming and be ready from ESE exam point of view.

INNOVATIVE METHOD: Conducted online quiz to check the understanding of students
Using https://quizizz.com/join?gc=668094&source=liveDashboard
Platform which have included reward/penalty rules likes games.



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Innovative Teaching and Learning Practices

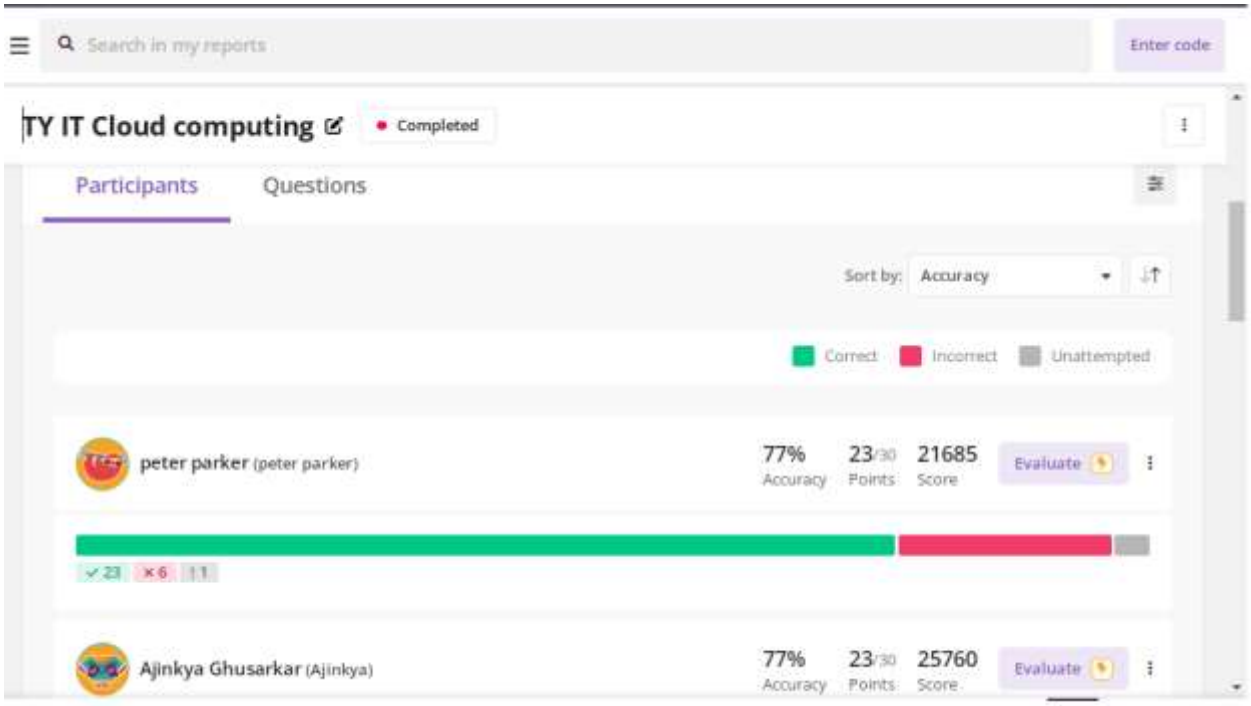
Innovative Teaching Approaches in Web Technology and Cloud Computing

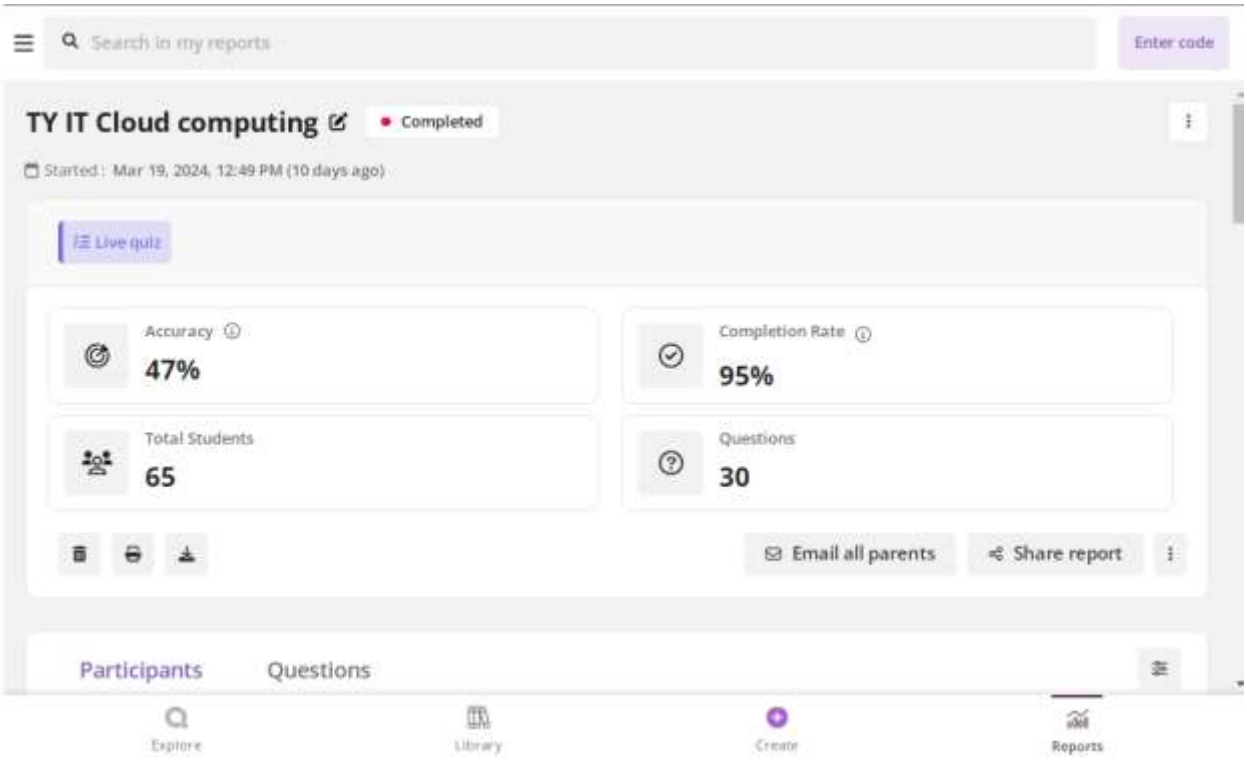
Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: Web Technology and Cloud Computing (IT3207)
Semester/Year: 2023-24 (Sem2)

Class:TY(IT)

Objective of the Practice: To check the understanding basic concepts of cloud computing such as Cloud Service Models: SaaS, PaaS, IaaS, Cloud provider, benefits and limitations, Cloud file-systems: GFS and HDFS,Virtualization

Innovative Method: Conducted online quiz to check the understanding of students
Using https://quizizz.com/join?gc=733093&source=liveDashboard
Platform which have included reward/penalty rules likes games.





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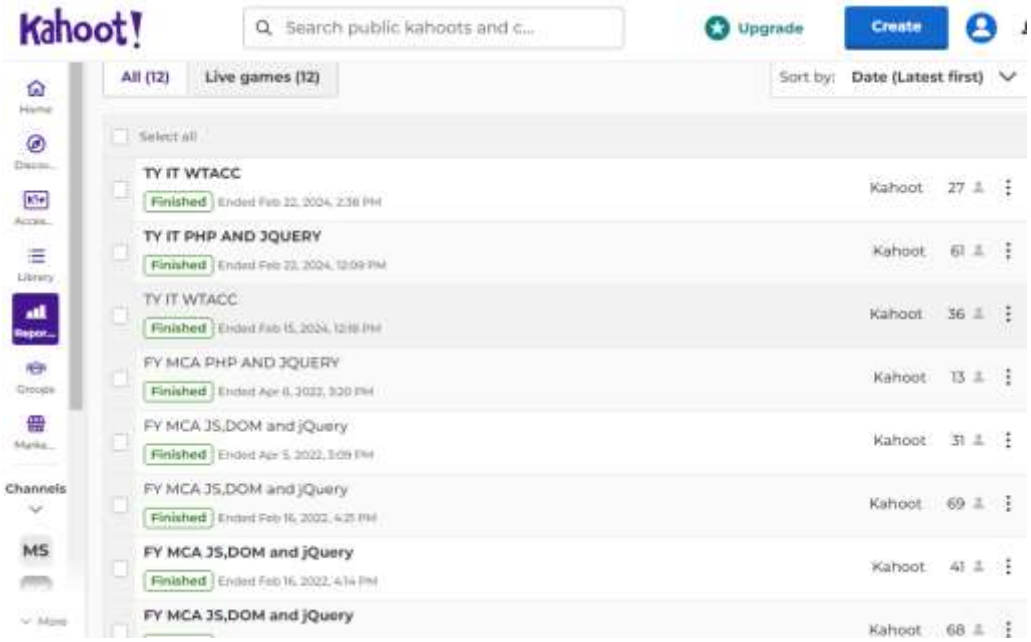
Innovative Teaching Approaches in Web Technology and Cloud Computing

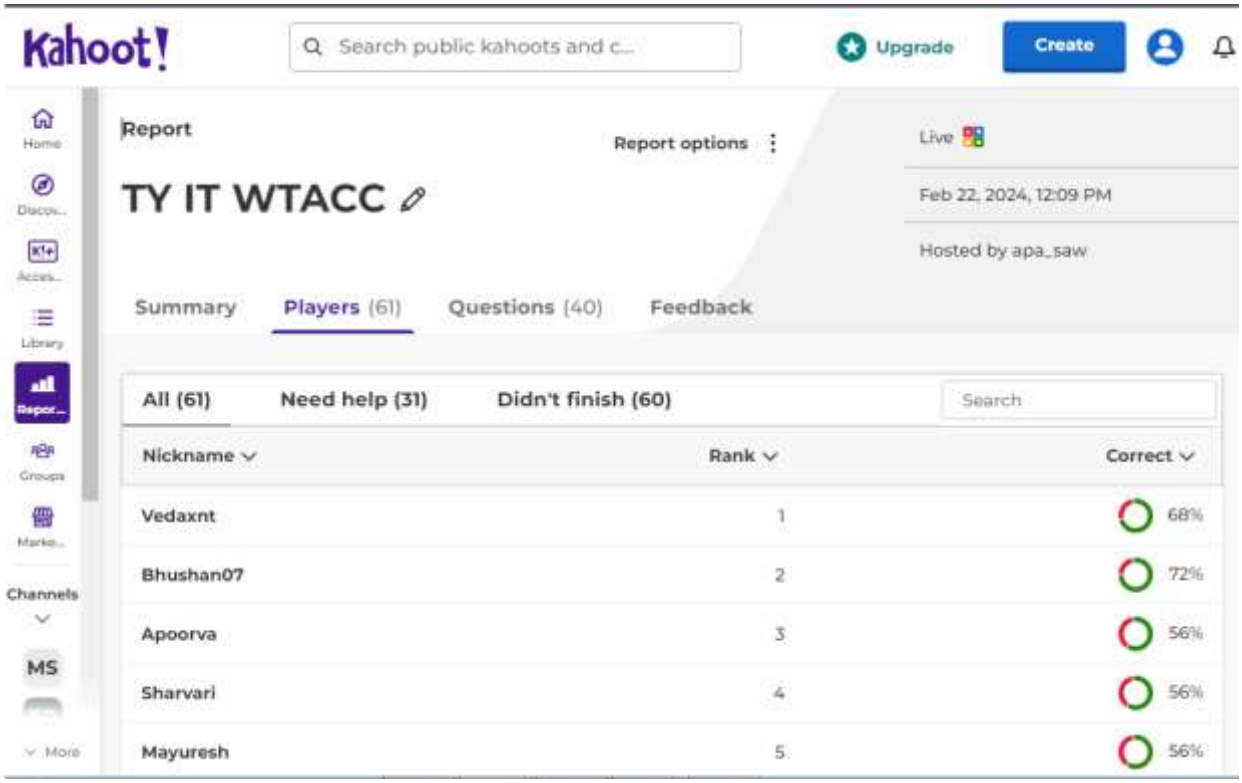
Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: Web Technology and Cloud Computing (IT3207)
Semester/Year: 2023-24 (Sem2)

Class:TY(IT)

Objective of the Practice: check the understanding of students on learned concepts.

Innovative Method: Conducted online quiz to check the understanding of students Using KAHOOT Platform.





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Innovative Teaching and Learning Practices

Innovative Teaching Approaches in Operating System

Name of Faculty Member(s): Aparna R Sawant
Department: Information Technology
Course: Operating System
Semester/Year: 2024-25 (Sem1)

Class:TY(IT)

Objective of the Practice: The **classical synchronization problem** primarily deals with coordinating the execution of processes or threads to ensure that shared resources are accessed in a controlled manner, thereby preventing issues such as race conditions, deadlocks, and inconsistencies

Methodology: ROLE PLAY

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