ONLINE EXAMINATION SYSTEM

INTRODUCTION

The Covid-19 pandemic has initiated a big paradigm, shifting the education system of not only India but the whole world. All the schools and colleges need to conduct their activities online from classes to examination. Classes can be done online easily through many software available, but in case of examinations, it a very big challenge to overcome the malpractice, since every-one is at their own homes. Large and renowned institutions and spending lakhs of rupees for finding and initiating the best platform to just conduct examinations. The very reason for all this could be the access of technology to the students.

Nowadays , students are getting more-and-more smarter with the evolution and introduction of new techniques. And even , after the introduction of Open Source , which allows developers to manipulate the scripts – students with sharp brains and humongous programming skills find ways. The examinations , though , being tried to be expected in a fair and restricted manner , students still find numerous ways to bypass the security system to get the answers. This will only damage the academic scope of the students.

The objective of this project is to create a platform to conduct free and fair examinations for the students with minimal scope of malpractice.

EXISTING SYSTEM

The existing system in this discussed in this project is VIT LMS . The LMS platform , though has a lot of features , but lacks in proctoring and analysis and capturing malpractice moments . The platform was defined , keeping in mind , only the normal students. The system has no compatibility with physically handicapped students. The LMS platform is quite unsafe as can take over by external forces (may be by JavaScript hacking OR SQL injection). If we talk about the frontend portion of the application , it seems quite simple but not very attractive. Students should be energized after seeing the platform – but this does the opposite of what is expected.

Another examination tool is Code Tantra ; it has all the necessary features to conduct examinations without malpractice like webcam proctoring , behavior recording and analysis. But it lacks in answering the questions because only text document up-loadings are the medium to respond – that too via mobile phone by scanning the document for that particular question (for that both laptop / PC and mobile have to be linked and synced).

The system moreover , is not capable to conduct small quizzes because it will violate the efficiency and ability of the application.

PROPOSED SYSTEM

Our proposed system has been made with most of the drawbacks being faced by the users of the existing system(s). Our system will take snapshots, every 3-5 second of the student, while giving the examination – These pictures shall be stored in the server for further analysis and claiming malpractice (if any suspicious behavior is found). The pictures shall only be accessed by the teachers and Site Administrators – constituting to make a proctoring report at the end , which can be showed to both the students as well the students.

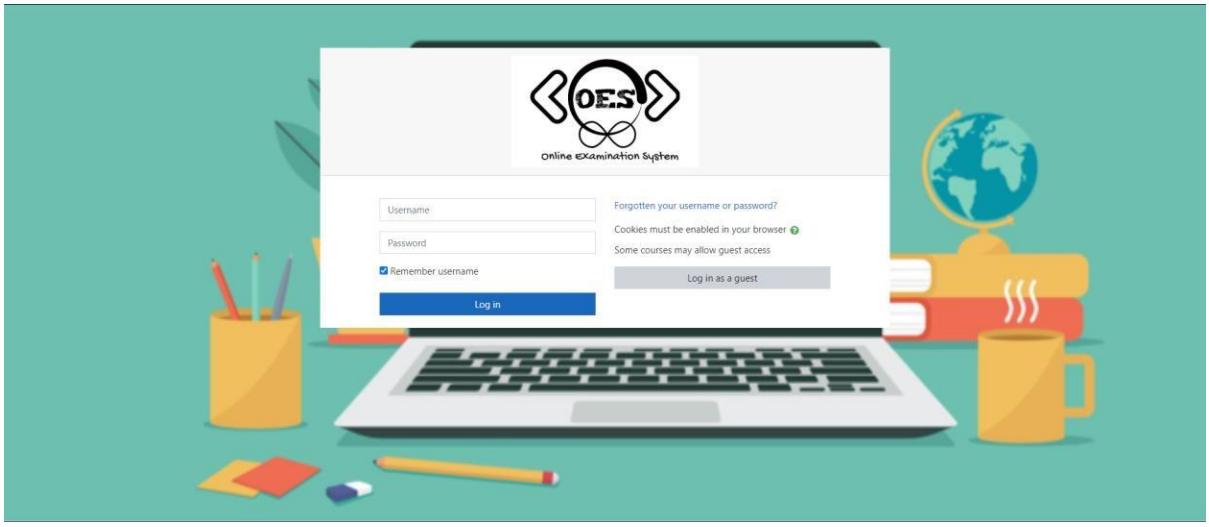
Traditional way of examination / assessment is quite boring and exhausting which was only based on Question – Answer concept. This method of assessment dates back to many decades ago. Now is the era of technology , people are getting smart and so are the way of assessment. The platform not only allows to write answers into a text box , but also one can upload his / her answer script in whatever way they can. They have the option of recording their voice and convert it into an audio file (.mp3 , etc.) – highly usable who have the inability to write / type. This does not stop here ; we have also included an interactive matching type question format (Will be shown the snapshots after some time).

Earlier times , the understanding of the whole subject by the student , was obtained by conducting one single test. But is quite tedious to mug up all the concepts at once and vomit everything in the paper. This is not at all learning. Our brain should be acting like a brain , not like a pressure cooker. Thus , we have given the privilege to take small step-by-step tests so that students shall test their understanding over the concepts and can gain confidence with minimal efforts. Hence , it's quite a dynamic platform.

Below are the steps to access the assess via the platform created. The platform name is **OES (Online examination System).**

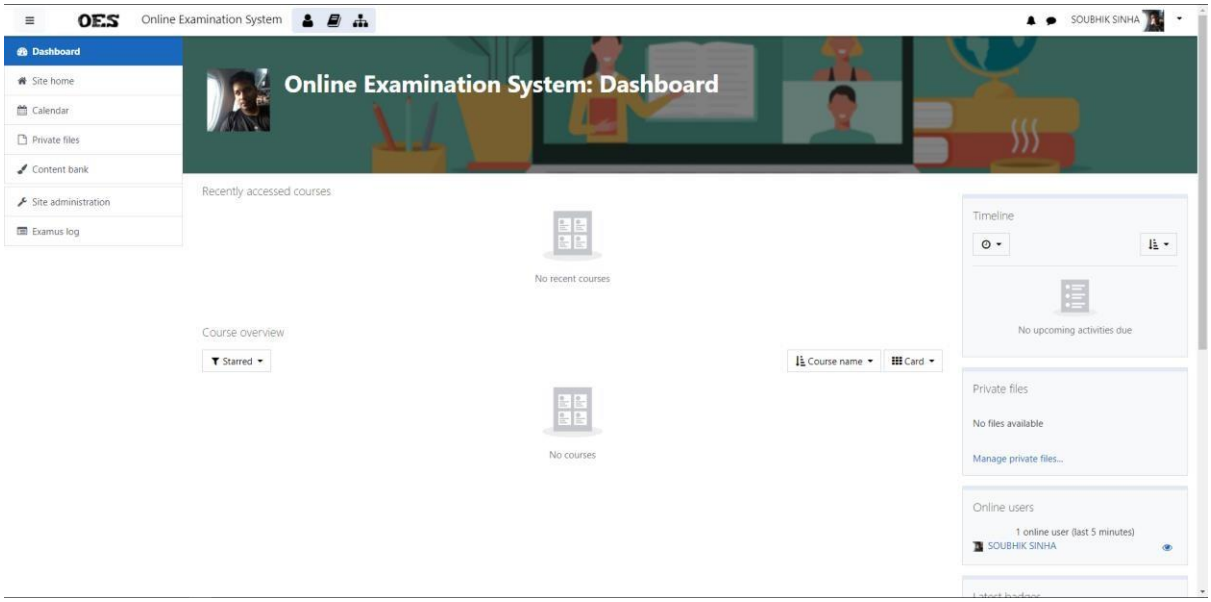
RESULTS AND DISCUSSION

1. THE LOGIN PAGE



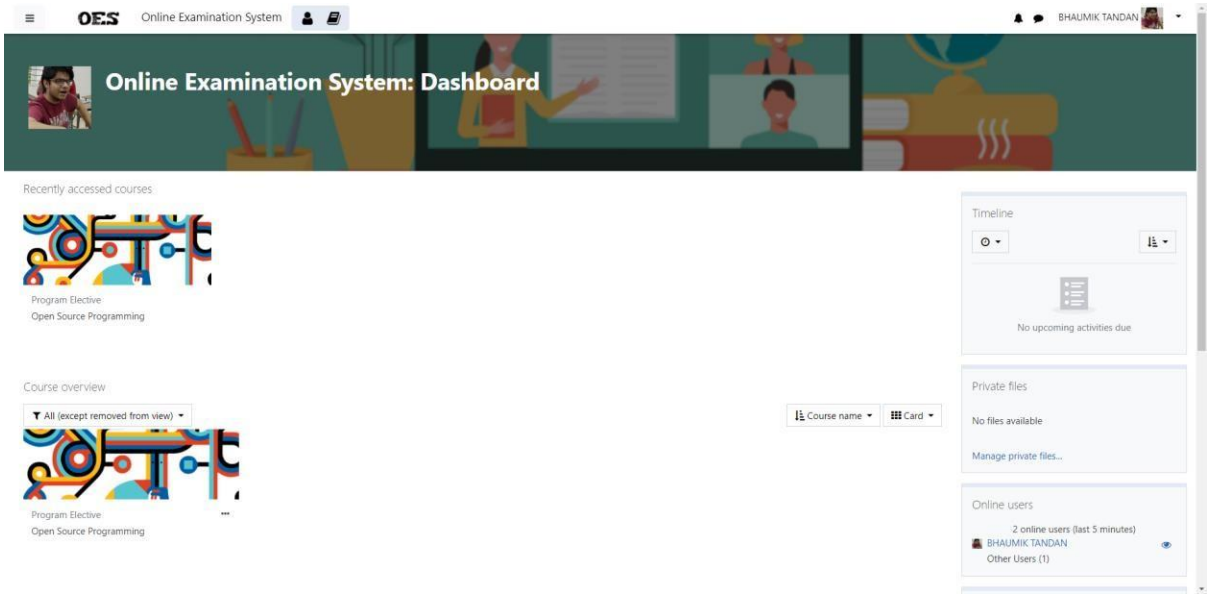
This page only needs username and password , given to the users , to access the application. We have also included the provision of resetting the password via email verification.

2. DASHBOARD

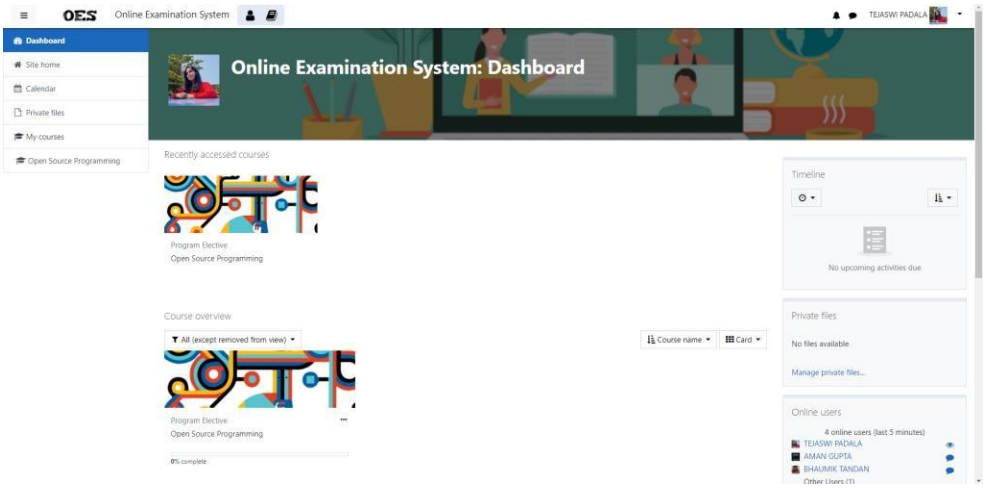


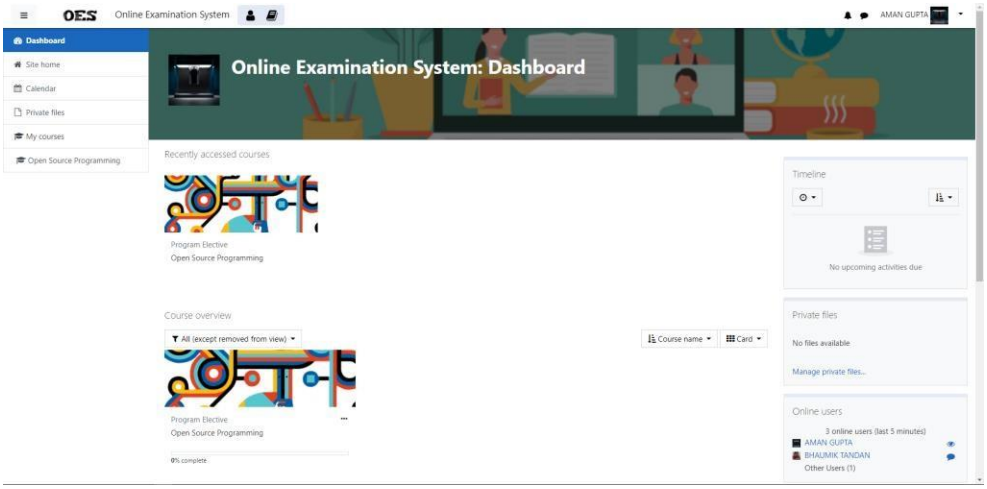
The dashboard here , seems a little interesting as there is cover picture , user profile DP and a few options to navigate around. Though this dashboard is of the Site administrator , the users' profile dashboard shall be looking much more interesting.

3. USER DASHBOARD(s)



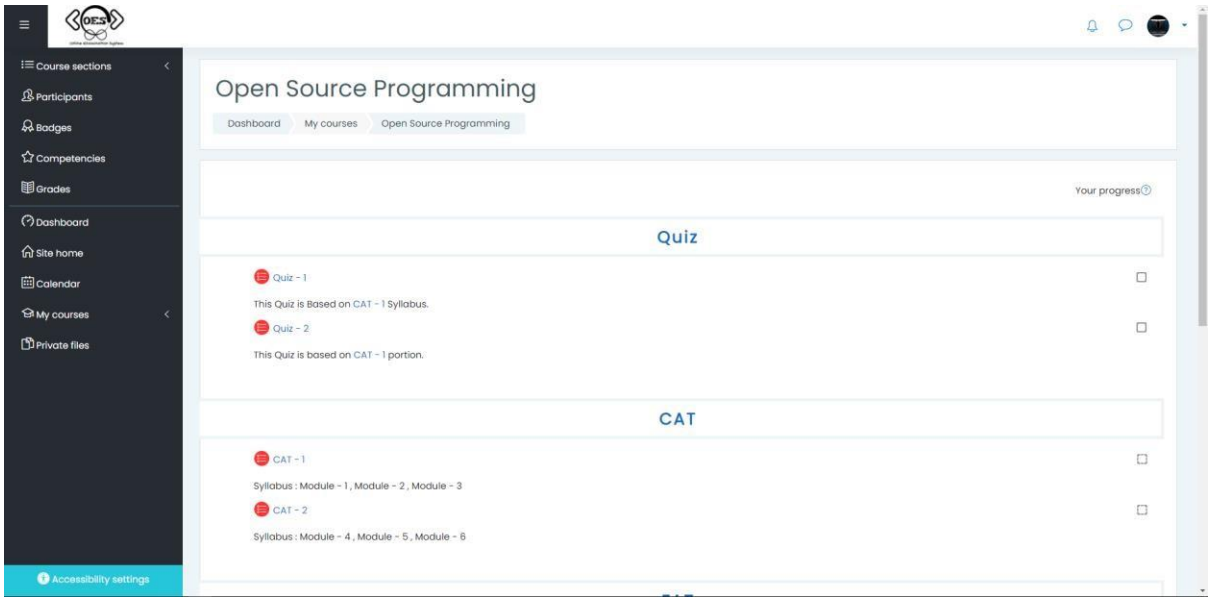
(Teacher)





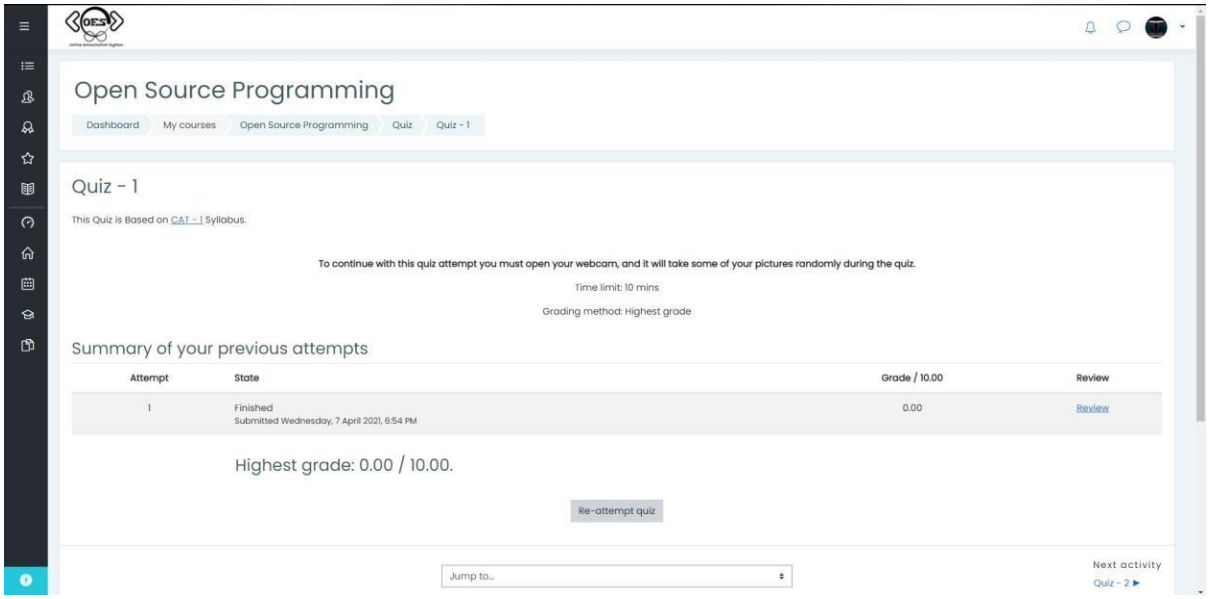
(Students)

4. EXAMINATION PORTAL

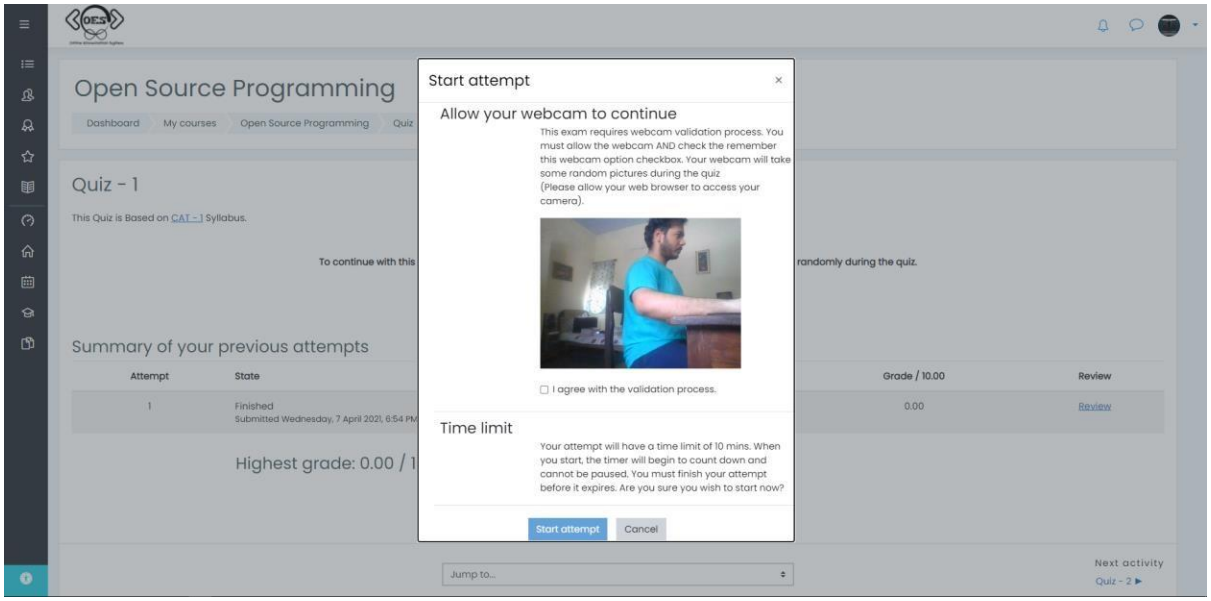


Once the student (user) clicks the course name , a number of tests becomes visible. The user shall choose any one , but not multiple tests at once.

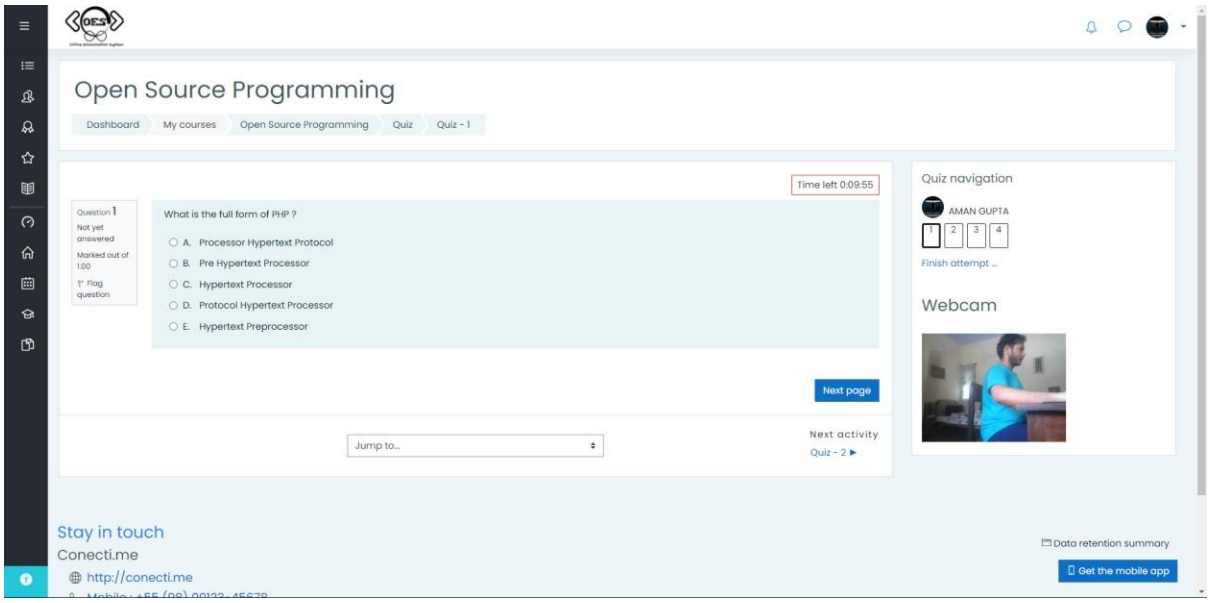
5. TEST COMMENCEMENT



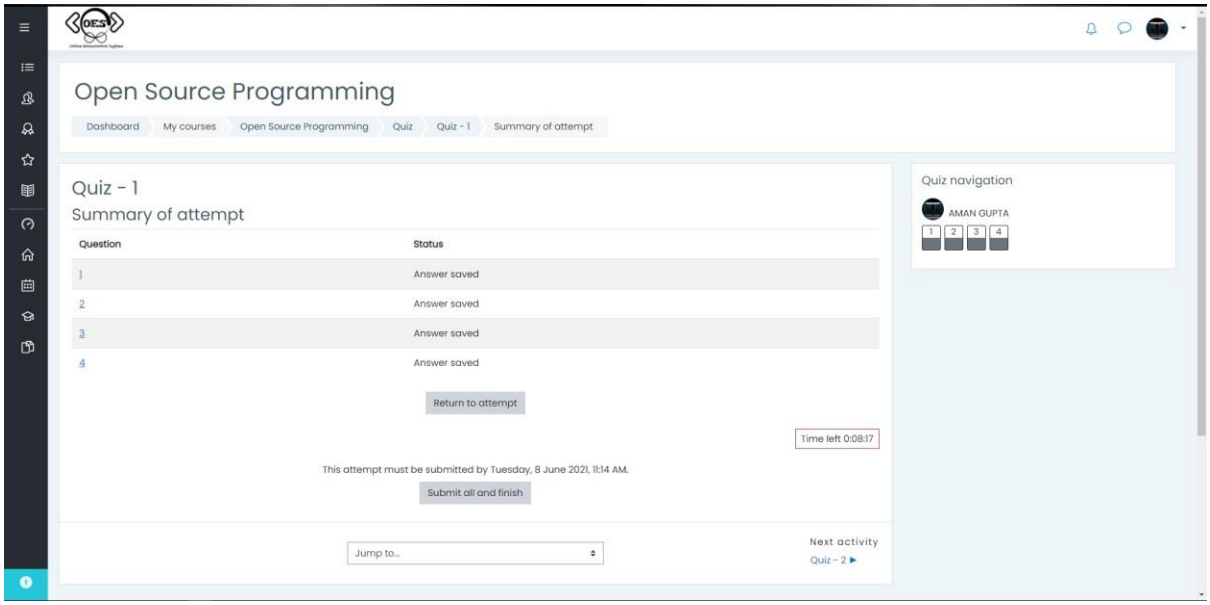
After clicking at one of the tests , a new page will open asking to start the test. The user will have to authenticate and allow webcam and audio / mic controls to enable LIVE proctoring.



6. QUESTIONING

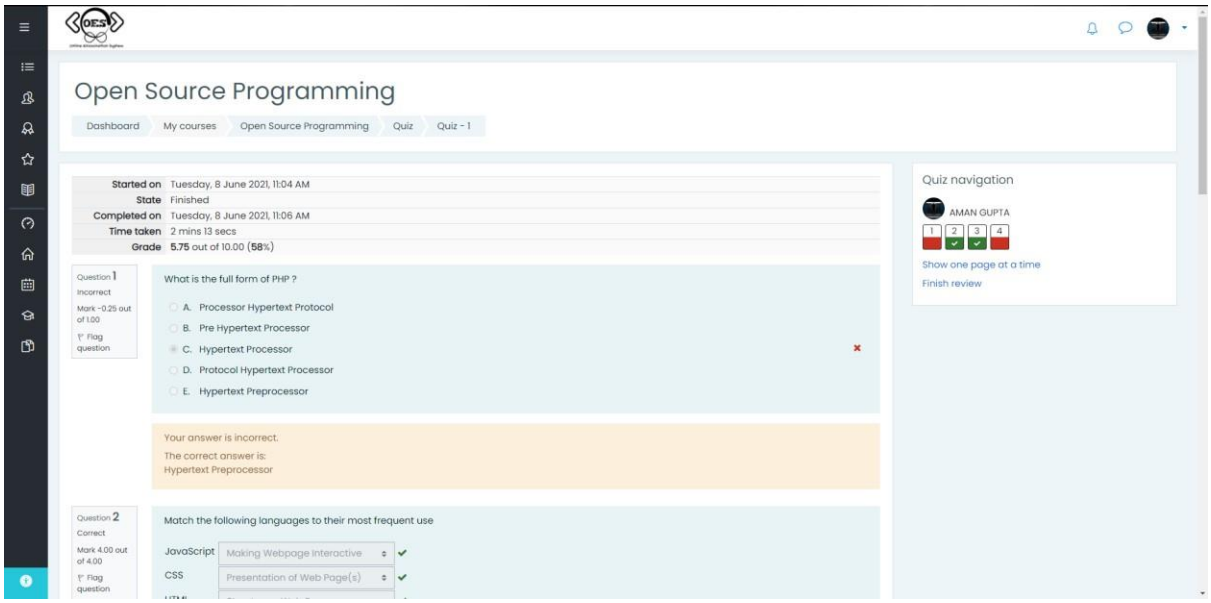


The questions will be displayed in the above visible manner , though as said there are more formats of questioning , we shall see some of them later.



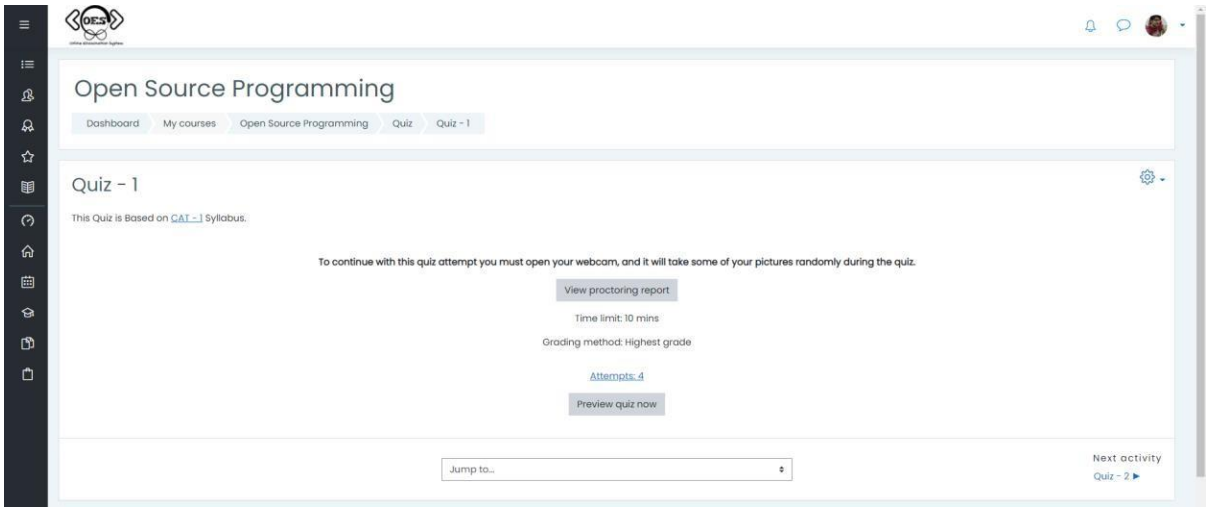
(Above page asks for submitting the quiz)

7. SCORE

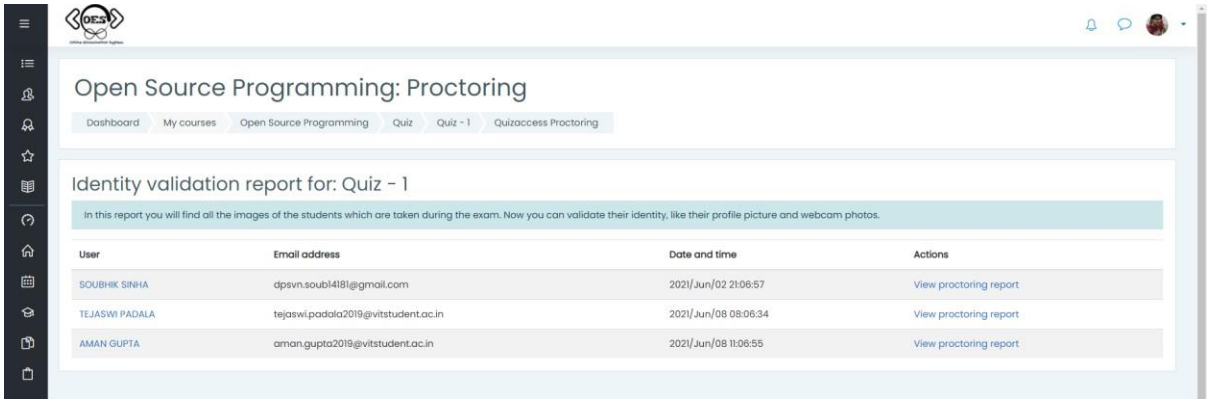


After submission , immediately scores are returned with correct / incorrect answers. The same shall be visible on the teachers' profile / account.

8. TEACHERS' ASSESSMENT AND REVIEW

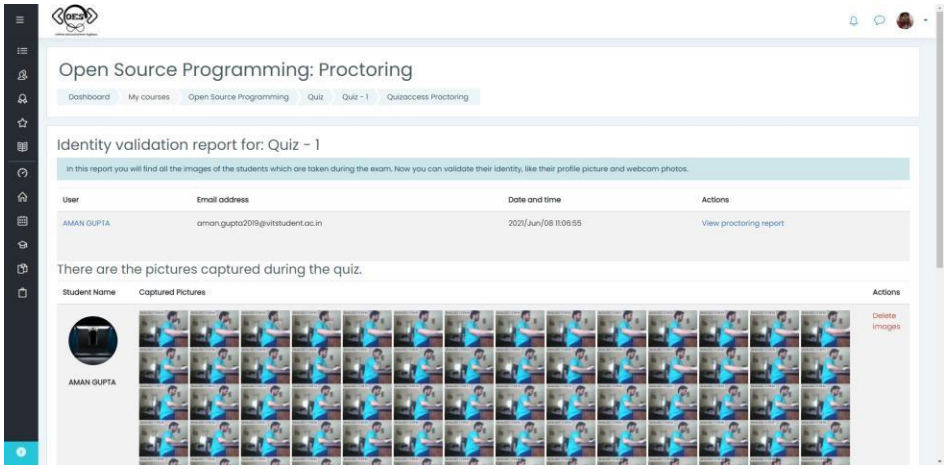


On teachers' side , he / she can view the proctoring report , which includes images taken at the time of assessment of the student.



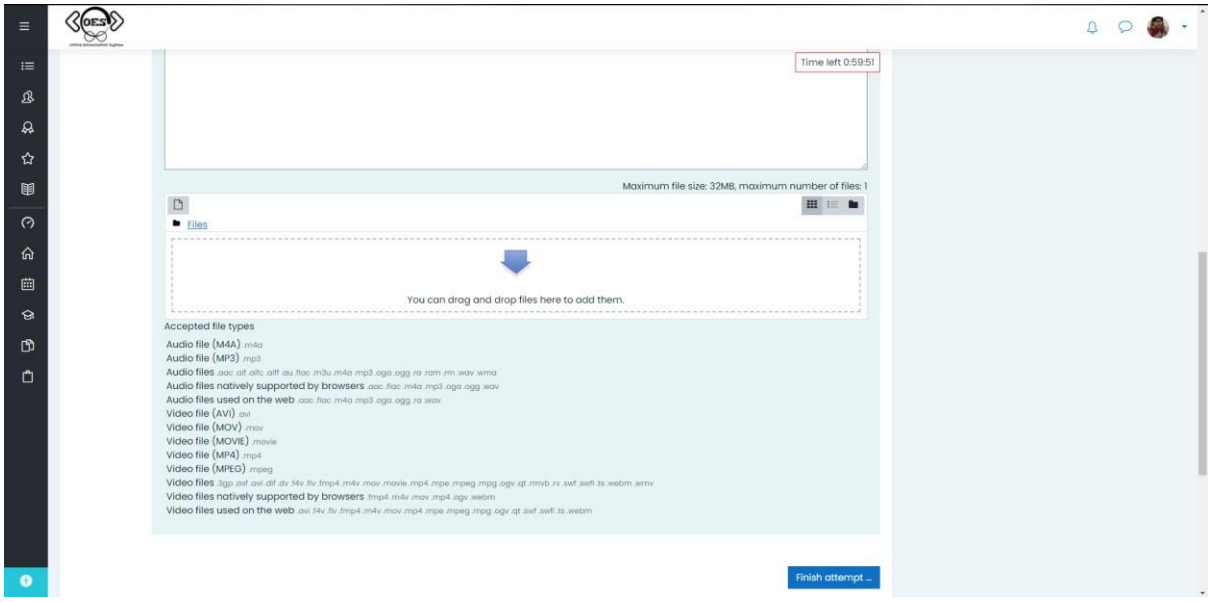
The teacher may also see the students who have taken the particular test at what time.

9. PROCTORING REPORT



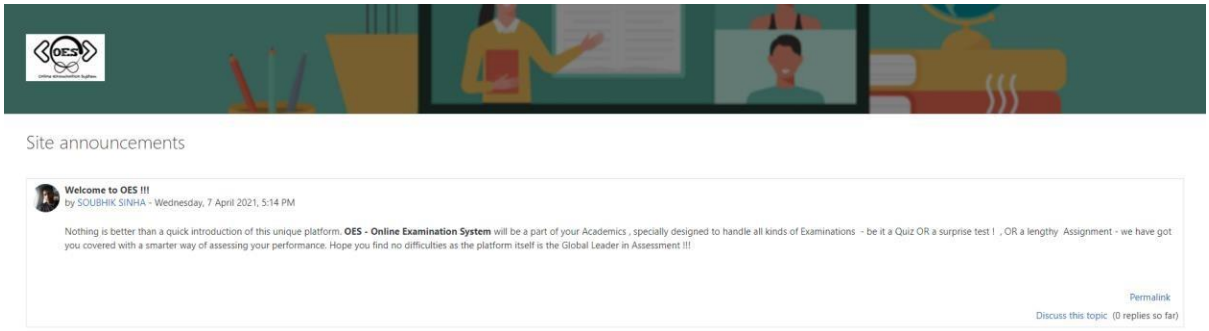
After selecting the proctoring report option , a number of images are shown , taken during the examination of the students' webcam. This will enable the teacher to check about the activities done.

10. ALTERNATE ANSWERING



As mentioned earlier , the student has the privilege to answer a particular question by recording his / her audio / video – with all the necessary audio / video formats available.

11. LOGGING OUT



After logging out of the application , a small description can be seen by the Site Administrator , depicting how efficient the system is

SELECTIVE / RELEVANT CODE SNIPPETS

FEEDBACK BY EXAMINERS

Feedback shall be given from the invigilators side to the students in various formats.

```php
/*Moodle has an inbuilt feedback system - which only supports / givesout text output. But think about those with physical disabilities.
  The below code / implementation shows how we added some more feeback mediums to the people with various options offered to them.
  Though the original code constitues hundreds of lines , we are showing here a small functionable unit.
*/
$allowed_recorders = get_config(constants::M_COMPONENT, 'allowedrecorders');
$allowed_recorders  = explode(',',$allowed_recorders);
$recorderoptions = array();

//Here , the feedback system shall respond via MP3 Voice (Audio)
if(array_search(constants::M_REPLYMP3VOICE,$allowed_recorders)!==false || array_search(constants::M_REPLYVOICE,$allowed_recorders)!==false)
{
    $recorderoptions[constants::M_REPLYMP3VOICE] = get_string("replymp3voice", constants::M_COMPONENT);
}

//Here , the feedback system responds via Video (a more understandable feature to be mentioned)
if(array_search(constants::M_REPLYVIDEO ,$allowed_recorders)!==false)
{
    $recorderoptions[constants::M_REPLYVIDEO ] = get_string("replyvideo", constants::M_COMPONENT);
}

//Below , its again a kind of text output but has the ability to show diagrams (Whiteboard)
if(array_search(constants::M_REPLYWHITEBOARD,$allowed_recorders)!==false)
{
    $recorderoptions[constants::M_REPLYWHITEBOARD ] = get_string("replywhiteboard", constants::M_COMPONENT);
}

//Now , the feedback shall be given via pictorial representation
if(array_search(constants::M_REPLYSNAPSHOT,$allowed_recorders)!==false)
{
    $recorderoptions[constants::M_REPLYSNAPSHOT] = get_string("replysnapshot", constants::M_COMPONENT);
}
```

ONLINE PROCTORING VIA WEBCAM

```
/*It sometimes become tough to monitor each and every student - even though the have their webCam turned ON.
  Here , we have shown a modified feature of video proctoring - a much precise way. Here the webCam shall take the pictures
  every 3 seconds (can be later changed) , thus , every activity of the student can be recorded as a form of image , which shall
  later be analyzed.
*/
if ($studentid != null && $cmid != null && $courseid != null && $reportid != null) {

    $data = array();
    $sql = "SELECT e.id as reportid, e.userid as studentid, e.webcampicture as webcampicture, e.status as status,
    e.timemodified as timemodified, u.firstname as firstname, u.lastname as lastname, u.email as email
    from {quizaccess_proctoring_logs} e INNER JOIN {user} u  ON u.id = e.userid
    WHERE e.courseid = '$courseid' AND e.quizid = '$cmid' AND u.id = '$studentid'";

    $sqlexecuted = $DB->get_recordset_sql($sql);
    echo '<h3>' . get_string('picturesusedreport', 'quizaccess_proctoring') . '</h3>';

    $tablepictures = new flexible_table('proctoring-report-pictures' . $COURSE->id . '-' . $cmid);

    $tablepictures->define_columns(
        array(get_string('name', 'quizaccess_proctoring'),
            get_string('webcampicture', 'quizaccess_proctoring'),
            'Actions'
        )
    );
    $tablepictures->define_headers(
        array(get_string('name', 'quizaccess_proctoring'),
            get_string('webcampicture', 'quizaccess_proctoring'),
            get_string('actions', 'quizaccess_proctoring')
        )
    );
```

```
    $tablepictures->define_baseurl($url);

    $tablepictures->set_attribute('cellpadding', '2');
    $tablepictures->set_attribute('class', 'generaltable generalbox reporttable');

    $tablepictures->setup();
    $pictures = '';

    $user = core_user::get_user($studentid);

    foreach ($sqlexecuted as $info) {
        $d = basename($info->webcampicture, '.png');
        $pictures .= $info->webcampicture
            ? '<a href="' . $info->webcampicture . '" data-lightbox="procImages"' . ' data-title ="' . $info->firstname . ' ' . $info->lastname .'">'.
                '<img width="100" src="' . $info->webcampicture . '" alt="' . $info->firstname . ' '
                . $info->lastname . '" data-lightbox="' . basename($info->webcampicture, '.png') .'"/>
              </a>'
            : '';
    }

    $userinfo = '<table border="0" width="110" height="160px">
                    <tr height="120" style="background-color: transparent;">
                        <td style="border: unset;">'.$OUTPUT->user_picture($user, array('size' => 100)).'</td>
                    </tr>

                    <tr height="50">
                        <td style="border: unset;"><b>' . $info->firstname . ' ' . $info->lastname . '</b></td>
                    </tr>
                </table>';

    //The pictures taken by the webCam can be deleted manually / After a particular span of time.
    $datapictures = array(
        $userinfo,
        $pictures,
        '<a onclick="return confirm(`Are you sure want to delete the pictures?`)" class="text-danger" href="?courseid=' . $courseid .
        '&quizid=' . $cmid . '&cmid=' . $cmid . '&studentid=' . $info->studentid . '&reportid=' . $info->reportid . '&logaction=delete">Delete images</a>'
    );
    $tablepictures->add_data($datapictures);
    $tablepictures->finish_html();
}
```

USER BEHAVIOUR BASED PROCTORING VIA Webcam

```
//Though we have mentioned the method of how the webcam will take pictures every few seconds of the student.
//But , it's still tough to examine the pictures. Thus , to enhance the reliability , we also added up live
//webcam proctoring with behaviour recognition - which may tell the user as well the examiner , the activities of the
//users' side and at the end of the test , generate a report for analysis. The pictures may also be sent to both the
//the student as well as the examiner.
public static function user_picture($useremail) {
    global $DB, $PAGE;

    self::validate_parameters(self::user_picture_parameters(), [
        'useremail' => $useremail,
    ]);

    $user = $DB->get_record('user', ['email' => $useremail]);

    if(!$user) {
        return ['success' => false, 'error' => 'User was not found'];
    }

    $userpictureurl = null;
    if($user && $user->picture){
        $userpicture = new user_picture($user);
        $userpicture->size = 200; // Size f3.
        $userpictureurl = $userpicture->get_url($PAGE)->out(false);
        $validuntill = time()+(60*60);

        if($userpictureurl){
            $key = get_user_key('core_files', $user->id, null, null, $validuntill);
            $userpictureurl = str_replace('/pluginfile.php/', '/tokenpluginfile.php/'.$key.'/', $userpictureurl);
            return ['success' => true, 'userpicture' => $userpictureurl];
        } else {
            return ['success' => false, 'error' => 'User has no image'];
        }
    } else {
        return ['success' => false, 'error' => 'User has no image'];
    }
}
```

CONCLUSION

Although we have tried to conduct examinations in a fare way online, but the system cannot be full proof, in order to achieve - we need to host the website and connect the phone and laptop at the same time from the website, and use one device (webcam) to proctor the student activities . And we can lock both the screens to avoid malpractices.

No system is full proof so the best way is to educate and aware students to not use unfair means of practices to give examinations and follow the ethics and code of conduct of the examinations. Because after all , it's for their own good.

REFERENCES

https://www.geeksforgeeks.org/moodle-a-digital-learning-platform/

https://moodle.org/

https://docs.moodle.org/dev/Coding

==========