

Tutorial Letter 101/0/2024

Operating Systems and Architecture COS3721

Year Module(s)

**Computer Science Department
School of Computing**

IMPORTANT INFORMATION

Please register on myUnisa, activate your myLife e-mail account and make sure that you have regular access to the myUnisa module website, COS3721-24-Y, as well as your group website.

Note: This is a fully online module. It is, therefore, only available on myUnisa.

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1 INTRODUCTION

Dear Student

Unisa is a comprehensive open distance e-learning (CODEL) higher education institution. The comprehensiveness of our curricula encapsulates a range of offerings, from strictly vocational to strictly academic certificates, diplomas and degrees. Unisa's "openness" and its distance eLearning character result in many students registering at Unisa who may not have had an opportunity to enrol in higher education. Our CODEL character implies that our programmes are carefully planned and structured to ensure success for students ranging from the under-prepared but with potential to the sufficiently prepared.

Teaching and learning in a CODEL context involves multiple modes of delivery ranging from blended learning to fully online. As a default position, all post graduate programmes are offered fully online with no printed study materials, while undergraduate programmes are offered in a blended mode of delivery where printed study materials are augmented with online teaching and learning via the learner management system – myUnisa. In some instances, undergraduate programmes are offered fully online as well.

Furthermore, our programmes are aligned with the vision, mission, and values of the University. Unisa's commitment to serve humanity and shape futures combined with a clear appreciation of our location on the African continent, Unisa's graduates have distinctive graduate qualities which include

- independent, resilient, responsible, and caring citizens who are able to fulfil and serve in multiple roles in their immediate and future local, national and global communities
- having a critical understanding of their location on the African continent with its histories, challenges and potential in relation to globally diverse contexts
- the ability to critically analyse and evaluate the credibility and usefulness of information and data from multiple sources in a globalised world with its ever-increasing information and data flows and competing worldviews
- how to apply their discipline-specific knowledges competently, ethically and creatively to solve real-life problems
- an awareness of their own learning and developmental needs and future potential

Whether a module is offered either as blended (meaning that we use a combination of printed and online material to engage with you) or online (all information is available via the internet), we use myUnisa as our virtual campus. This is an online system that is used to administer, document and deliver educational material to you and support engagement with you. Look out for information from your lecturer as well as other Unisa platforms to determine how to access the virtual myUnisa module site. Information on the tools that will be available to engage with the lecturer and fellow students to support your learning will also be communicated via various platforms.

You are encouraged to log into the module site on myUnisa regularly (that is, at least twice per week). The module website: COS3721-24-Y.

In this module, we will study the basic principles and concepts of operating systems. A user communicates with the computer via the operating system, which is therefore an extremely important software component of the computer system. Furthermore, techniques developed for operating systems influence many other areas of computer science, including computer architecture, programming languages, compilers, databases, computer networks and mobile agents.

The students registered for this module are expected to have a very good background in general assembly language programming and computer organisation covered in the module COS2621 or an equivalent module.

Because this is a fully online module, you will need to use myUnisa to study and complete the learning activities for this module. Visit the website for **COS3721** on myUnisa frequently. The website for your module is **COS3721-23-Y1**.

We wish you every success with your studies!

2 MODULE OVERVIEW

2.1 Purpose

Students who successfully complete this module will be able to develop the knowledge, skills and competencies of the functionality of general operating systems including CPU scheduling, process coordination and concurrency, deadlocks, memory management, protection and security within distributed systems, which will support further studies and applications in Computer Science in the field of Operating Systems. It provides the necessary knowledge, skills and competencies to understand how the user communicates with the computer via the operating system and how the techniques developed for operating systems influence many other areas of Computer Science, including computer architecture, programming languages, compilers, databases, computer networks and mobile agents.

2.2 Outcomes

For this module, you will have to master several outcomes:

- **Specific outcome 1:** Describe the basics principles of computer system organisation and identify different operating system components.
- **Specific outcome 2:** Apply operating systems principles to solve process management problems.
- **Specific outcome 3:** Apply operating system principles to solve memory management problems.
- **Specific outcome 4:** Explain electronic storage management issues.
- **Specific outcome 5:** Explain security and protection issues for operating systems
- **Specific outcome 6:** Discuss issues relevant for distributed systems

3 CURRICULUM TRANSFORMATION

Unisa has implemented a transformation charter, in terms of which the university has placed curriculum transformation high on the teaching and learning agenda. Curriculum transformation includes student-centred scholarship, the pedagogical renewal of teaching and assessment practices, the scholarship of teaching and learning, and the infusion of African epistemologies and philosophies. All of these will be phased in at both programme and module levels, and as a result of this you will notice a marked change in the teaching and learning strategy implemented by Unisa, together with the way in which the content is conceptualised in your modules. We encourage you to embrace these changes during your studies at Unisa in a responsive way within the framework of transformation

4 LECTURER(S) AND CONTACT DETAILS

4.1 Lecturer(s)

By the time this tutorial letter 101 is developed in August 2023, the primary lecturer for this module is : Dr Cyrille Dongmo. If by the time you are studying the lecturer has changed, please consult the tutorial letter 301 (SOCALL) for the contact details of the relevant lecturer.

Department: Computer Science

Telephone: +27 11 471 2247

E-mail: Dongmc@unisa.ac.za

4.2 Department

You can contact the Department of Computer Science as follows:

Telephone number: 011 670 9200

E-mail: computing@unisa.ac.za

4.3 University

Contact addresses of the various administrative departments appear on the Unisa website: <http://www.unisa.ac.za/sites/corporate/default/Contact-us/Student-enquiries>.

Please include the student number in all correspondence

5 RESOURCES

5.1 Prescribed book(s)

The prescribed textbook for this module is:

Abraham Silberschatz, 2019, Operating System Concepts, 10th Edition, Wiley, ISBN –

E-book: 978-1-119-45586-8, paperback: 978-1-119-45408-3

5.2 Recommended book(s)

Ann McIver Mchoes, 2018, Understanding Operating Systems, 8th Edition, CENGAGE Learning, USA, 9781305674257

Recommended books can be requested online, via the Library catalogue.

E-reserves can be downloaded from the library webpage Find e-reserves. More information is available at: <http://oasis.unisa.ac.za/search/r>

5.3 Library services and resources

The Unisa Library offers a range of information services and resources. The library has created numerous library guides, available at <http://libguides.unisa.ac.za>

Recommended guides:

- For brief information on the library, go to <https://www.unisa.ac.za/library/libatglance>
- For more detailed library information, go to <http://www.unisa.ac.za/sites/corporate/default/Library>
- Frequently Asked Questions, visit <https://www.unisa.ac.za/sites/corporate/default/Library/Frequently-Asked-Questions>
- For research support and services such as the Personal Librarian service and the Information Search Librarian's Literature Search Request (on your research topic) service, visit <http://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Research-support>.
- For library training for undergraduate students, visit <https://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Training>
- Lending Services <https://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Lending-services>
- Services for Postgraduate students - <https://www.unisa.ac.za/sites/corporate/default/Library/Services-for-Postgraduates>
- Support and Services for students with disabilities - <https://www.unisa.ac.za/sites/corporate/default/Library/Services-for-students-with-special-needs>
- Library Technology Support - <https://libguides.unisa.ac.za/techsupport>
- Finding and using library resources and tools - http://libguides.unisa.ac.za/Research_skills
- A–Z list of library databases – <https://libguides.unisa.ac.za/az.php>

Important contact information:

- Technical problems encountered in accessing library online services: Lib-help@unisa.ac.za
- General library-related queries: Library-enquiries@unisa.ac.za
- Queries related to library fines and payments: Library-fines@unisa.ac.za
- Interlibrary loan service for postgraduate students: libr-ill@unisa.ac.za
- Literature Search Service: Lib-search@unisa.ac.za
- Social media channels: Facebook: UnisaLibrary and Twitter: @UnisaLibrary

6 STUDENT SUPPORT SERVICES

The *Study @ Unisa* brochure is available on myUnisa: www.unisa.ac.za/brochures/studies

This brochure contains important information and guidelines for successful studies through Unisa.

If you need assistance with regard to the myModules system, you are welcome to use the following contact details:

- Toll-free landline: 0800 00 1870 (Select option 07 for myModules)
- E-mail: mymodules22@unisa.ac.za or myUnisaHelp@unisa.ac.za

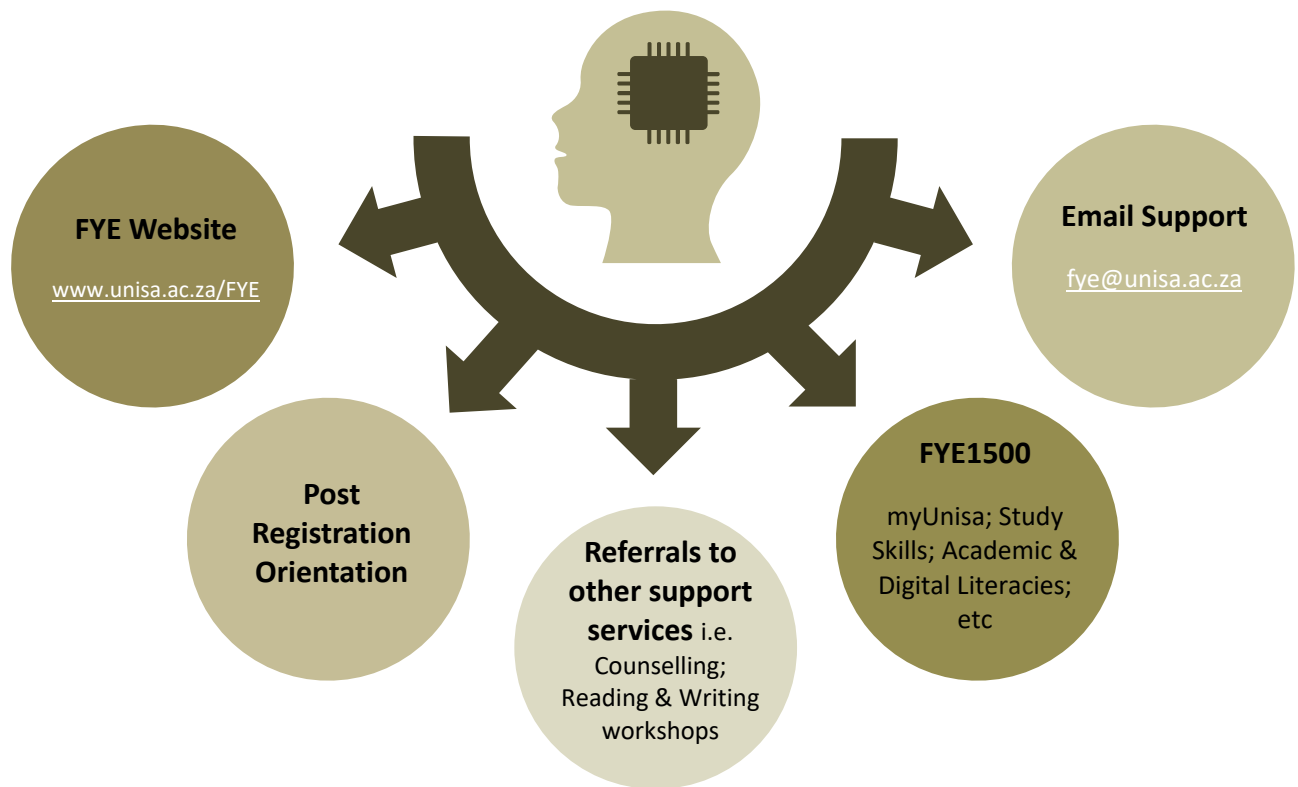
You can access and view short videos on topics such as how to view your calendar, how to access module content, how to view announcements for modules, how to submit assessment and how to participate in forum activities via the following link: <https://dtls-ga.unisa.ac.za/course/view.php?id=32130>

Registered Unisa students get a free myLife e-mail account. Important information, notices and updates are sent exclusively to this account. Please note that it can take up to 24 hours for your account to be activated after you have claimed it. Please do this immediately after registering at Unisa, by following this link: myLifeHelp@unisa.ac.za

Your myLife account is the **only** e-mail account recognised by Unisa for official correspondence with the university and will remain the official primary e-mail address on record at Unisa. You remain responsible for the management of this e-mail account.

6.1 First-Year Experience Programme

Many students find the transition from school education to tertiary education stressful. This is also true in the case of students enrolling at Unisa for the first time. Unisa is a dedicated open distance and e-learning institution, and it is very different from face-to-face/contact institutions. It is a mega university, and all our programmes are offered through either blended learning or fully online learning. It is for this reason that we thought it necessary to offer first-time students additional/extended support to help them seamlessly navigate the Unisa teaching and learning journey with little difficulty and few barriers. We therefore offer a specialised student support programme to students enrolling at Unisa for the first time – this is Unisa's First-Year Experience (FYE) Programme, designed to provide you with prompt and helpful information about services that the institution offers and how you can access information. The following FYE services are currently offered:



To ensure that you do not miss out on important academic and support communication from the SRU, please check your myLife inbox regularly.

7. STUDY PLAN

Week	Chapter to study	
1-2	Chapter 1:	Introduction
3-4	Chapter 2:	Operating-System Structures
5	Chapter 3:	Processes
6	Chapter 4:	Threads and Concurrency
7-8	Chapter 5:	CPU Scheduling
9	Do Assignment no.1	
10	Chapter 6:	Synchronization Tools
11	Chapter 7:	Synchronization Examples
12	Chapter 18:	Virtual Machines
13	Chapter 8:	Deadlocks
13-14	Chapter 9:	Main Memory
15	Chapter 10:	Virtual-Memory
16-17	Do Assignment no.2	
17-18	Chapter 11:	Mass-Storage Structure

19	Chapter 12:	I/O Systems
19	Chapter 14:	File-System Implementation
20	Chapter 16:	Security
20	Chapter 17:	Protection
21	Chapter 19	Networks and Distributed Systems
22	Do Assignment no.3	
23-24	Exam preparation	

8 HOW TO STUDY ONLINE

8.1 What does it mean to study fully online?

Studying online is a method of education whereby students learn in a fully virtual environment.

- **All your study material and learning activities for online modules are designed to be delivered online on myUnisa.**
- **All your assignments must be submitted online.** This means that you will do all your activities and submit all your assignments on myUnisa. In other words, you may **NOT** post your assignments to Unisa using the South African Post Office.
- **All communication between you and the University happens online.** Lecturers will communicate with you via e-mail and SMS, and use the **Announcements**, the
- **Discussion Forums** and the **Questions and Answers** tools. You can also use all of these platforms to ask questions and contact your lecturers.

9. ASSESSMENT

9.1 Assessment criteria

Your formative and summative assessments will focus on your understanding and ability to solved problems related to:

- Operating-System Structures,
- Process management,
- Process synchronization,
- Memory management,
- Storage management,
- File system,

- Security and protection,
- Virtual Machines, and
- Networks and Distributed systems.

9.2 Assessment plan

- To complete this module, you will be required to submit 03 (three) assessments.
- All information about when and where to submit your assessments will be made available to you via the myModules site for your module.
- Due dates for assessments, as well as the actual assessments are available on the myModules site for this module.
- To gain admission to the examination, you will be required to submit at least 1(one) assignment.
- The assignment weighting for the module is 30%.
- You will receive examination information via the myModules sites. Please watch out for announcements on how examinations for the modules for which you are registered will be conducted.
- The examination will count 70% towards the final module mark.

9.3 Assessment due dates

- There are no assignment **due dates** included in this tutorial letter.
- Assignment due dates will be made available to you on the myUnisa landing page for this module. We envisage that the due dates will be available to you upon registration.
- Please start working on your assessments as soon as you register for the module.
- Log on to the myUnisa site for this module to obtain more information on the due dates for the submission of the assessments.

9.4 Submission of assessments

- Unisa, as a comprehensive open distance e-learning institution (CODEL), is moving towards becoming an online institution. You will therefore see that all your study material, assessments and engagements with your lecturer and fellow students will take place online. We use myUnisa as our virtual campus.
- The myUnisa virtual campus will offer students access to the myModules site, where learning material will be available online and where assessments should be completed. This is an online system that is used to administer, document, and deliver educational material to students and support engagement between academics and students.
- The myUnisa platform can be accessed via <https://my.unisa.ac.za>. Click on the myModules 2024 button to access the online sites for the modules that you are registered for.

- The university undertakes to communicate clearly and as frequently as is necessary to ensure that you obtain the greatest benefit from the use of the myModules learning management system. Please access the announcements on your myModules site regularly, as this is where your lecturer will post important information to be shared with you.
- When you access your myModules site for the module/s you are registered for, you will see a welcome message posted by your lecturer. Below the welcome message you will see the assessment shells for the assessments that you need to complete. Some assessments may be multiple choice, some tests, others written assessments, some forum discussions, and so on. All assessments must be completed on the assessment shells available on the respective module platforms.
- To complete quiz assessments, please log on to the module site where you need to complete the assessment. Click on the relevant assessment shell (Assessment 1, Assessment 2, etc.). There will be a date on which the assessment will open for you. When the assessment is open, access the quiz online and complete it within the time available to you. Quiz assessment questions are not included in this tutorial letter (Tutorial Letter 101) and are only made available online. You must therefore access the quiz online and complete it online where the quiz has been created.
- It is not advisable to use a cell phone to complete the quiz. Please use a desktop computer, tablet or laptop when completing the quiz. Students who use a cell phone find it difficult to navigate the **Online Assessment** tool on the small screen and often struggle to navigate between questions and successfully complete the quizzes. In addition, cell phones are more vulnerable to dropped internet connections than other devices. **If at all possible, please do not use a cell phone for this assessment type.**
- For written assessments, please note the due date by which the assessment must be submitted. Ensure that you follow the guidelines given by your lecturer to complete the assessment. Click on the submission button on the relevant assessment shell on myModules. You will then be able to upload your written assessment on the myModules site of the modules that you are registered for. Before you finalise the upload, double check that you have selected the correct file for upload. Remember, no marks can be allocated for incorrectly submitted assessments.

9.4.1 Types of assignments and descriptions

All assignments are defined as either optional, mandatory, compulsory, or elective.

- **Elective assignments**
 - If not submitted, the student gets no mark for this item.
 - The best of the required submissions will count.
- **Mandatory assignments**
 - If not submitted, the student gets no mark for this item.
- **Compulsory assignments**
 - If not submitted, the result on the student's academic record will be *absent*.
- **Optional assignments** – You are encouraged as a student to do optional assignment so that it may benefit your learning.

I. Elective assignments

- a. the student is given a choice of which assignments within an identified group to submit, only the best result(-s), the number of which is specified in advance, will contribute towards the year mark.
- b. elective assignments must also be grouped into an elective group.
- c. for the student to select which assignment to submit, the elective assignments must be grouped together. For such an elective group, relevant information must be provided to the student, such as how many of the assignments must be submitted and how many of the assignment marks should be combined into the year mark.
- d. The selection criteria define how marks received for assignments in an elective group are to be combined into the year mark. Three different criteria may be used for calculating the year mark:
 - The best mark should be used, or
 - If the student submits fewer than the required number of assignments per group or no assignment in a group, a mark of 0% will be used.
 - 0% is awarded to all non-submitted or unmarked assessments. A best mark is then calculated from all items.

II. Mandatory assignments

- a. contribute to the year mark.
- b. If a student fails to submit a mandatory assignment, no mark is awarded and the year mark is calculated accordingly. The student will therefore forfeit the marks attached to this assignment when the final mark for the module is calculated.

III. Compulsory Assessment

- a. when not submitted, the student will fail a Continuous Assessment module but will be shown as absent from the examination in the case of other modules.

- iv. **Optional assignments** – You are encouraged as a student to do optional assignment so that it may benefit your learning.

9.5 The assessments

As indicated in section 9.2, you need to complete 03 assessments for this module. Details on the assessments will be made available on the myunisa platform in due time.

There are no assignments included in this tutorial letter. Assignments and due dates will be made available to you on myModules for this module. We envisage that the due dates will be available to you upon registration.

The following is a breakdown of the formal assessment activities as they become due during the year:

Assignment	Assessment type	Year Mark Weight
Formative assessments		
1	Written assignment	35%

2	MCQ with short essay type questions	35%
3	Written assignment	30%

In this course, you will be assessed through 3 **compulsory practical assignments and a final examination**. The assignments contribute towards a year mark. Assignments 1 and 2 contribute 35% each, and assignment 3 contributes 30% towards the year mark. Your year mark will then contribute **30%** towards your final mark and the examination mark will contribute **70%**.

The assignments make up a year mark out of 100 towards the formative assessment. The exam mark counts 100% towards the summative assessments. The year mark and exam mark together make the final mark.

Formative assessments (assignments) 30%+ Summative assessment 70% = Final mark.

Assignment marks (30 % weight) + exam mark (70% weight) = Final mark

*Assignment1 mark *35% + Assignment 2 mark * 35% + Assignment 3 mark *30% = the assignment mark*

*Assignment mark * 30% = year mark*

9.6 Other assessment methods

There are no other assessment methods for this module.

9.7 The examination

Examination information and details on the format of the examination will be made available to you online via the myUnisa site. Look out for information that will be shared with you by your lecturer and e-tutors (where relevant) and for communication from the university.

9.7.1 Invigilation/proctoring

Since 2020 Unisa conducts all its assessments online. Given stringent requirements from professional bodies and increased solicitations of Unisa's students by third parties to unlawfully assist them with the completion of assignments and examinations, the University is obliged to assure its assessment integrity through the utilisation of various proctoring tools: Turnitin, Moodle Proctoring, the Invigilator App and IRIS. These tools will authenticate the student's identity and flag suspicious behaviour to assure credibility of students' responses during assessments. The description below is for your benefit as you may encounter any or all of these in your registered modules:

Turnitin is a plagiarism software that facilitates checks for originality in students' submissions against internal and external sources. Turnitin assists in identifying academic fraud and ghost writing. Students are expected to submit **typed** responses for utilisation of the Turnitin software.

The **Moodle Proctoring tool** is a facial recognition software that authenticates students' identity during their Quiz assessments. This tool requires access to a student's **mobile or laptop camera**. Students must ensure their camera is activated in their browser settings prior to their assessments.

The Invigilator “mobile application-based service does verification” of the identity of an assessment participant. The Invigilator Mobile Application detects student dishonesty-by-proxy and ensures that the assessment participant is the registered student. This invigilation tool requires students to download the app from their Play Store (Google, Huawei and Apple) on their **mobile devices** (camera enabled) prior to their assessment.

IRIS Invigilation software verifies the identity of a student during assessment and provides for both manual and automated facial verification. It has the ability to record and review a student's assessment session. It flags suspicious behaviour by the students for review by an academic administrator. IRIS software requires installation on students' **laptop devices** that are enabled with a webcam.

Students who are identified and flagged for suspicious dishonest behaviour arising from the invigilation and proctoring reports are referred to the disciplinary office for formal proceeding.

Please note:

Students must refer to their module assessment information on their myModule sites to determine which proctoring or invigilation tool will be utilised for their formative and summative assessments.

10. ACADEMIC DISHONESTY

10.1 Plagiarism

Plagiarism is the act of taking the words, ideas and thoughts of others and presenting them as your own. It is a form of theft. Plagiarism includes the following forms of academic dishonesty:

- Copying and pasting from any source without acknowledging the source.
- Not including references or deliberately inserting incorrect bibliographic information.
- Paraphrasing without acknowledging the original source of the information.

10.2 Cheating

Cheating includes, but is not limited to, the following:

- Completing assessments on behalf of another student, copying the work of another student during an assessment, or allowing another student to copy your work.
- Using social media (e.g. WhatsApp, Telegram) or other platforms to disseminate assessment information.
- Submitting corrupt or irrelevant files, this forms part of examination guidelines
- Buying completed answers from so-called “tutors” or internet sites (contract cheating).

10.3 For more information about plagiarism, follow the link below:

<https://www.unisa.ac.za/sites/myunisa/default/Study-@-Unisa/Student-values-and-rules>

11. STUDENTS LIVING WITH DISABILITIES

The Advocacy and Resource Centre for Students with Disabilities (ARCSWiD) provides an opportunity for staff to interact with first-time and returning students with disabilities.

If you are a student with a disability and would like additional support or need additional time for assessments, you are invited to contact (name and e-mail address of the lecturer must be inserted) to discuss the assistance that you need.

12. IN CLOSING

Do not hesitate to contact us by e-mail if you are experiencing problems with the content of this tutorial letter or with any academic aspect of the module.

We wish you a fascinating and satisfying journey through the learning material, and trust that you will complete the module successfully.

Enjoy the journey!

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