

# Computational Models for Embedded Systems

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Faculty of Mathematics and Computer Science  
Babeș-Bolyai University  
Cluj-Napoca  
2025-2026



Lecture 5: SLR





# Faculty of Mathematics and Computer Science

## Babeș-Bolyai University

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"Tell me and I forget, teach me and I may remember, involve me and I learn."

(Benjamin Franklin)

# Outline

## SLR report

- SLR elements
- SLR process
- SLR deliverable

## SLR - presentation

- Pecha Kucha presentation style
- Structure
- Elements to be included

## SLR - poster

- Structure
- Elements to be included

# Class schedule (tentative)

1	3 oct.	Introduction	Assignment 1 Problem statement. SDG UBBGoesGreen (Lab 1) => Lab 7
2	10 oct.	Model checking (1)	
3	17 oct.	Model checking (2)	
4	24 oct.	Synchronous Model	
5	31 oct.	Asynchronous Model	
6	7 nov.	Invited lecture: Automotive by Synopsys	Assignment 2 Model checking JSpin (Lab 2, Lab3) => Lab 7
7	14 nov.	Finite State Machine (1)	
8	21 nov.	Invited lecture: Keeping Rails in Check by Accenture	
9	28 nov.	Finite State Machine (2)	
10	5 dec.	Petri nets	
11	12 dec.	Timed models Invited lecture (1): Keeping Rails in Check by Accenture (pending?)	Assignment 3 a)Finite State Machine b)Petri Nets (Lab 4, Lab 5, Lab 6) => Lab 7
12	19 dec.	Hybrid systems	
		<b>Holiday</b>	
13	9 ian.	Dynamical systems	
14	16 ian.	Report Presentation, Exam preparation	

Class	Room, hours
Seminar (Friday)	L321 14-16 SDI (S2)
Seminar (Friday)	L402 16-18 258/1 (S1) 258/2 (S2)
Lecture (Friday)	C335 18-20

**SLR Lecture  
When?**

# Grading

## Final Grade

[https://www.cs.ubbcluj.ro/files/curricula/2025/syllabus/IS\\_sem3\\_MME8026\\_en\\_avescan\\_2025\\_9498.pdf](https://www.cs.ubbcluj.ro/files/curricula/2025/syllabus/IS_sem3_MME8026_en_avescan_2025_9498.pdf)

- To be Updated about the Grading (after this first lecture)

To be UPDATED?  
10-Oct-2025

- Research
- Dissertation Thesis
  - Internship in Specialization

- Final Grade = 50% Seminar (=10%\*Pb+20%\*MC + 20%\*FSM) + 50% Exam (=10%Quiz+40%\*ReportSLR)
- Conditions to participate at the final exam
  - There is no restriction regarding the participation at the written examination regarding obtained marks Pb, MC, FSM.
- Pb, MC, FSM work may not be redone in the retake session.
- Conditions to pass/complete the CMES discipline:
  - Final Grade  $\geq 5$  final grade.

<http://www.techedupteacher.com/gamify-your-class-level-i-xp-grading-system-2/>

## Gamify Your Class

	Side Quests (Lab projects)	Epic Quests (Final exam)
Normal session	Pb + MC + FSM 1500 XP	Up to 1500 XP (Quiz 300 + ReportSLR 1200 XP)
Retake session	Received during Normal session <small>Points obtained in the didactic activity period (labs and seminar and bonus activity cannot be redone in the normal/retake session).</small>	Up to 1500XP

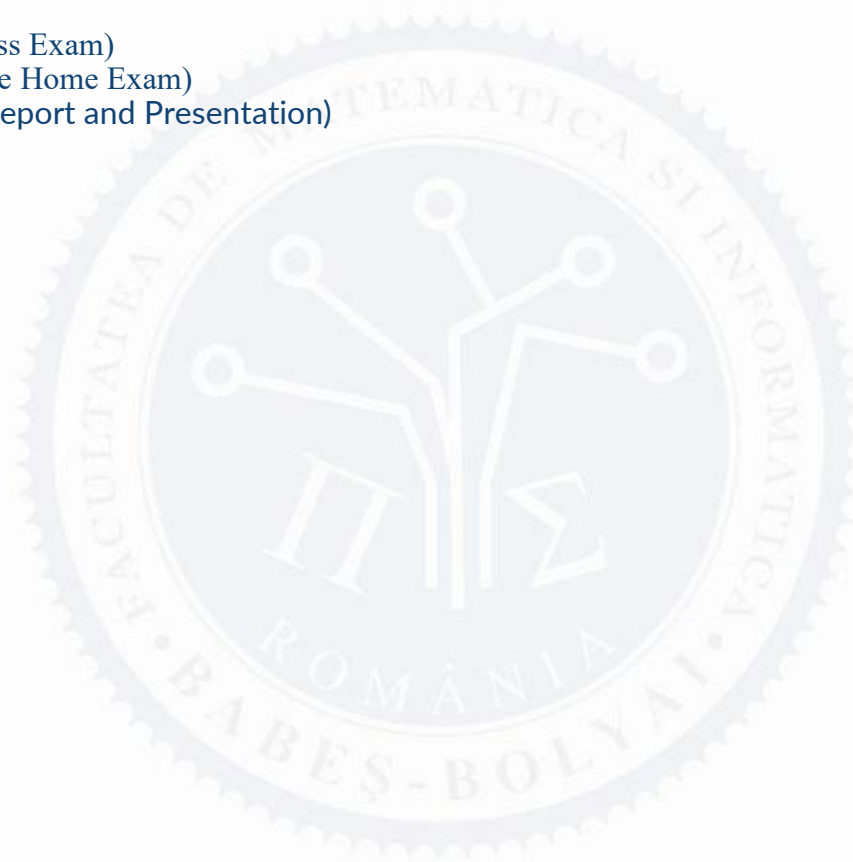
XP intervals	Grade
[1400,1500]	5
[1501,1800]	6
[1801,2100]	7
[2101,2400]	8
[2401,2700]	9
Over 2700	10

Final exam – you must come (be present) to the final exam in order to compute the grade!



# Epic Quests (Final exam)

- Up to 1500 XP
  - 300 XP – Quiz (In Class Exam)
  - 1200 XP – Report (Take Home Exam)
    - Social Quests (Report and Presentation)



# Social Quests (Report and Presentation)

- Up to 1200 XP
- Conduct a Systematic Literature Review on a provided research topic.
  - Testing Embedded systems or Quality attributes of Embedded Systems or Internet of Things or
- References
  - Barbara Kitchenham, Procedures for Performing Systematic Reviews, 2004
  - Barbara Kitchenham, Guidelines for performing Systematic Literature Reviews in Software Engineering, 2007
  - Example: PhD Thesis (Chapter 3)
- Team: 3-5 students/team
- Tasks (48h:12=4h/week)

3 students=30 papers (starting from 90 papers)  
4 students=40 papers (starting from 120 papers)  
5 students=50 papers (starting from 150 papers)

Each student from the team selects  
30 papers and reduces to 10 papers

You can create an account here  
<https://www.e-nformation.ro/> (use  
@scs.ubbcluj.ro account) and download the  
papers. If the papers are not available, please  
email the teacher the doi id of the paper.

Tasks  
for one  
student  
in the  
team

01. Search and save the title (doi) of the articles (minimum 30 articles) (6h)
  - 01.a. snowballing procedure
02. Read abstracts and reduce from 30 to 10 papers (6h)
03. Read each of the 10 papers
  - 03.a. create standardized data extraction form = all relevant information for each study, allowing you to examine and compare results.
  - 03.b. produce 1 paragraph (approach, used method, dataset, obtained results) (3h\*10articles=30h)
04. Summarizing table with the 10 articles (6h)
  - 04.a. Tabulating extracting data
05. Future work and opportunities
  - 05.a. Discussions of results
  - 05.b. Gaps, challenges, open issues
  - 05.c. Opportunities/Recommendations
06. Report containing
  - Explain the methodology applied (all the steps and findings regarding various characteristics of the selected articles).
  - The 10 paragraphs and the Summarizing table and Future work and opportunities.
07. Presentation of the SLR process and results – Pecha Kucha presentation type (10 minutes)

## SLR report template

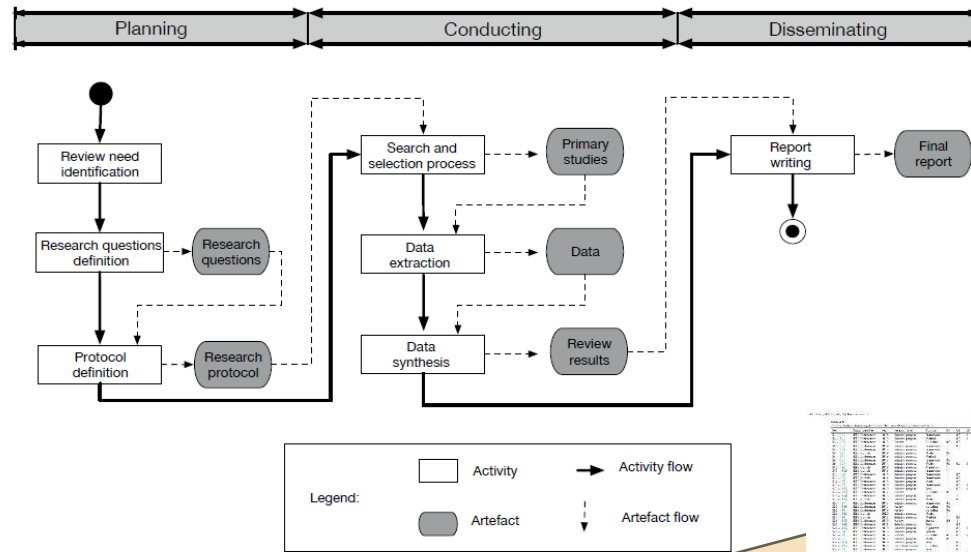
<https://www.overleaf.com/9296348645hvshcgqfbbkt>

Create a copy and change the names for Student1 and Student2 and Student3  
(2024\_CMES\_SLR\_Student1Student2). Please do not write in the shared project (it is just  
for copy).

SLR Report pdf + Recorded 10min Video + Poster

Must be submitted in Teams under the Assignment Assignment\_SRL\_Report – one  
day before exam date

# SLR (1)



- Excel file - For each line:
  - Paper information
  - Characteristics related to the aim/topic and to the RQ
    - Example: approach, used method, dataset, etc
    - Minimum 7

Examples  
Kitchenham et al. [21] used the extraction form shown in Table 7 (note the actual form also included the quality questions).

Table 7 Data Collection form completed for Maxwell et al., 1998

Data item	Value	Additional notes
Data Extractor	SI	
Study identifier		
Application domain	Space, military and industrial	
Name of database	European Space Agency (ESA)	
Number of projects in database (including within company projects)	106	
Number of cross-company projects	60	
Number of projects in within company data set	29	
Size metrics		
FP (lines)	LOC: Yes (9,LOC)	
Version used	Others: No	
LOC (lines)		
Version used		
Others (lines)		
Number		
Number of companies	37	

Fig. 3. A screenshot from the online repository of papers (papa.org/1980420).

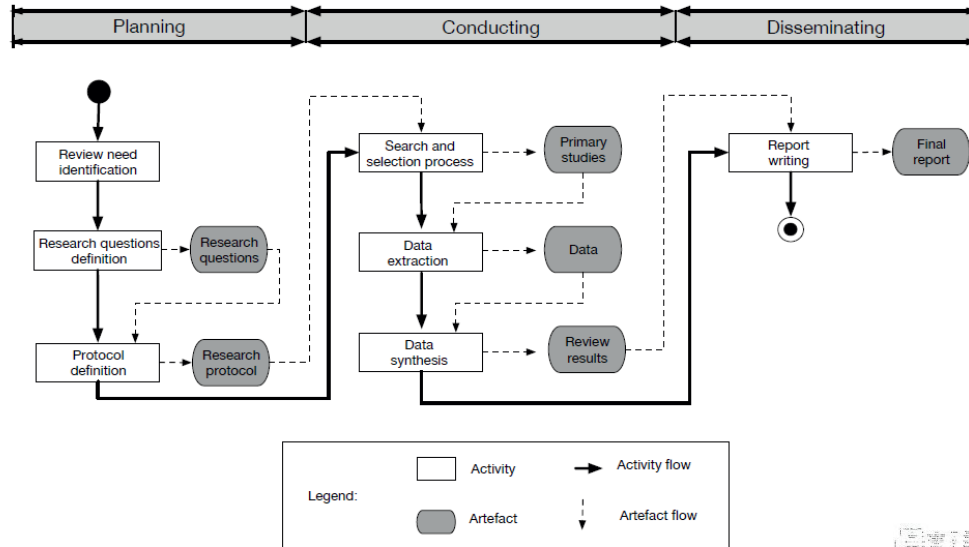
Author	Year	Topic	Method	Dataset	Results
Maxwell et al.	1998	Space, military and industrial	European Space Agency (ESA)	106 projects	60 cross-company projects
Kitchenham et al.	2001	Software development	Software development	100 projects	50 cross-company projects
...	...	...	...	...	...

In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

- Example: PhD Thesis (Chapter 3)
- Team work
  - Chosen Topic: the same for all students in the team
  - Define Research Questions (RQ)
  - Define Keyword and Search string
- For each student in the team
  - 01. Search and save the title (doi) of the articles (minimum 30 articles)
    - 01.a. showballing procedure
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  - 08. Poster



# SLR (2)



- Table with the extracted data
  - Details regarding the paper and various characteristics
  - Minimum 5 characteristics

Author	Year	Title	Journal	Abstract
Smith, J.	2018	Machine Learning in Healthcare	Journal of Medical Research	Machine learning algorithms are used to analyze medical data for disease diagnosis.
Johnson, A.	2019	Deep Learning for Image Classification	IEEE Transactions on Pattern Analysis and Machine Intelligence	Deep learning models are used for image classification tasks.
Williams, B.	2020	Neural Networks for Natural Language Processing	Journal of Artificial Intelligence Research	Neural networks are used for natural language processing tasks.
Lee, C.	2021	Reinforcement Learning for Robotics	Journal of Robotics and Autonomous Systems	Reinforcement learning is used for training robots in complex environments.

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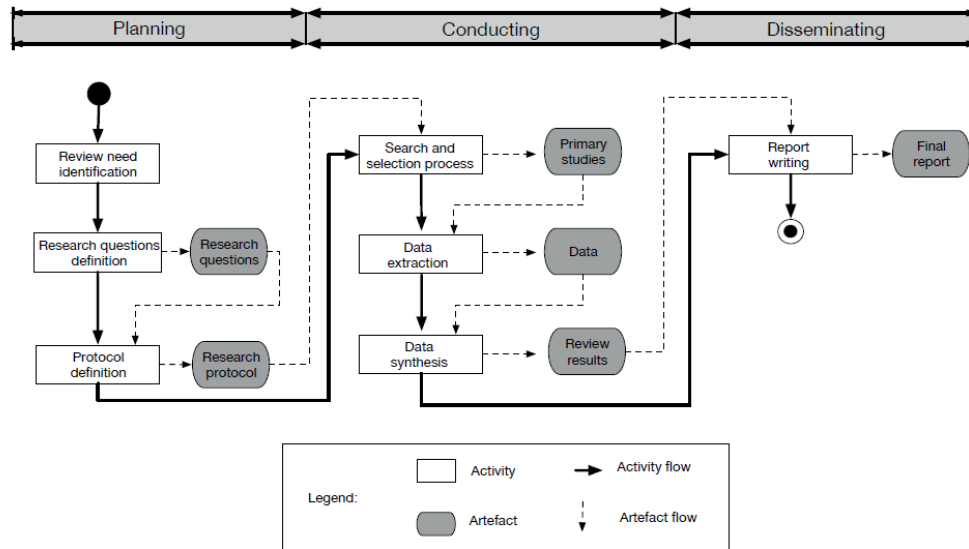
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- Example: PhD Thesis (Chapter 3)
- Team work
  - Chosen Topic: the same for all students in the team
  - Define Research Questions (RQ)
  - Define Keyword and Search string
- For each student in the team
  - Search and save the title (doi) of the articles (minimum 30 articles)
    - 01.a. showballing procedure
  - Read abstracts and reduce from 30 to 10 papers
  - Read each of the 10 papers
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    - 05.b. Gaps, challenges, open issues
    - 05.c. Opportunities/Recommendations
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    - The 10 paragraphs and the Summarizing table and Future work and opportunities.
  - Presentation of the SLR process and results – Pecha Kucha presentation type (10 minutes)
  - Poster

# SLR (3)



In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

## • Example: PhD Thesis (Chapter 3)

### • Team work

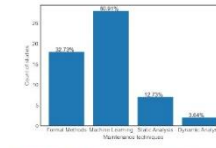
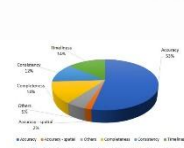
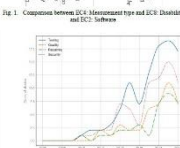
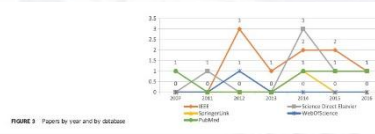
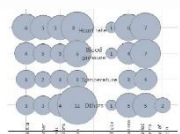
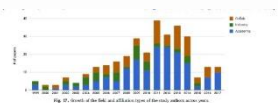
- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### • For each student in the team

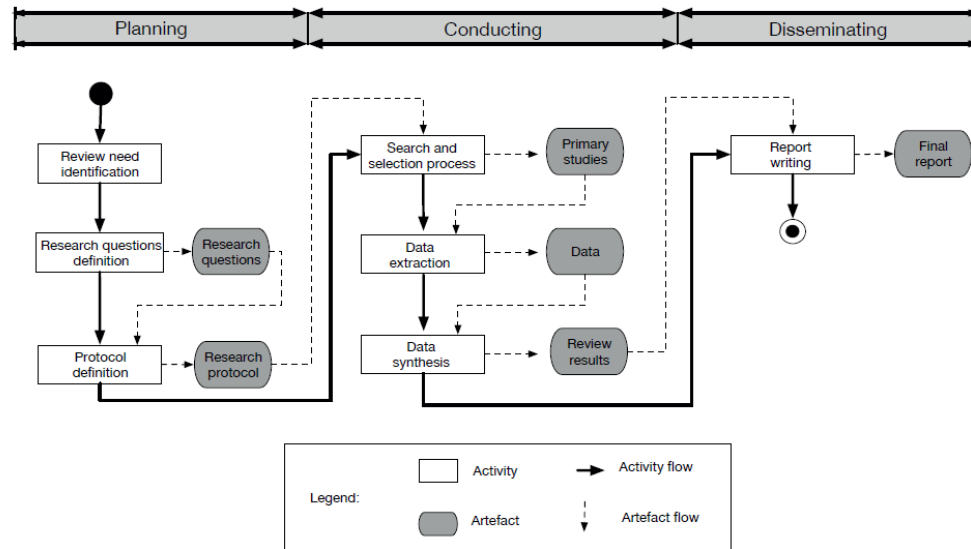
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- 08. Poster

## • Results

- Various types of charts for analysis
  - Minimum 5 charts
- The research questions are repeated and an answers are provided.



# SLR (4)



In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

## • Example: PhD Thesis (Chapter 3)

### • Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### • For each student in the team

- 01. Search and save the title (doi) of the articles (minimum 30 articles)
  - 01.a. showballing procedure
- 02. Read abstracts and reduce from 30 to 10 papers
- 03. Read each of the 10 papers
  - 03.a. create standardized data extraction form = all relevant information for each study, allowing you to examine and compare results.
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- 08. Poster

- Challenges and open issues
- Opportunities/Recommendations

## V. IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

In this section, we identify new opportunities for future

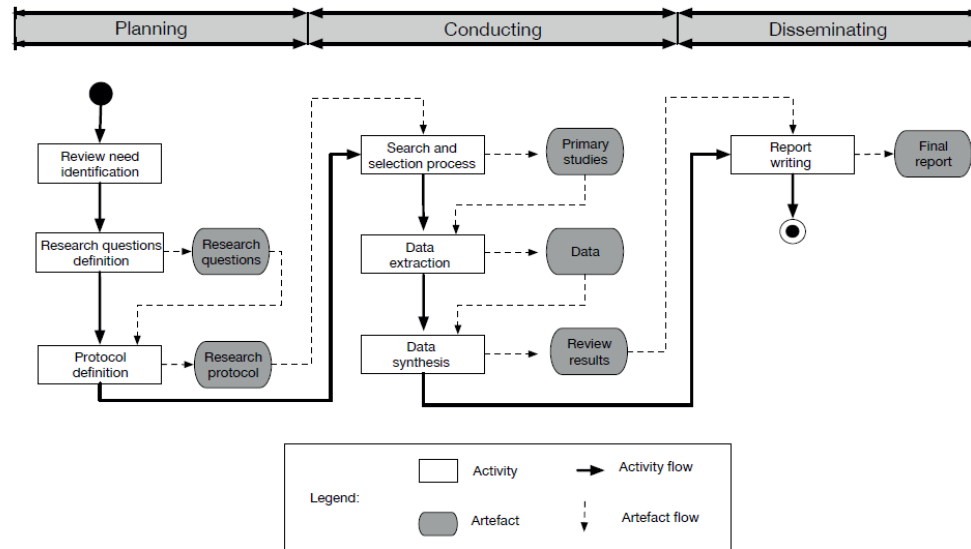
### 6. Perspectives and future direction

4.2.1 | Open challenges involving unaddressed areas

4.2.2 | Open challenges involving unutilized approaches and unaddressed testing problems



# SLR (5)



In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

## • Example: PhD Thesis (Chapter 3)

### • Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### • For each student in the team

- 01. Search and save the title (doi) of the articles (minimum 30 articles)
  - 01.a. showballing procedure
- 02. Read abstracts and reduce from 30 to 10 papers
- 03. Read each of the 10 papers
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- 08. Poster

### • Content of the Video presentation

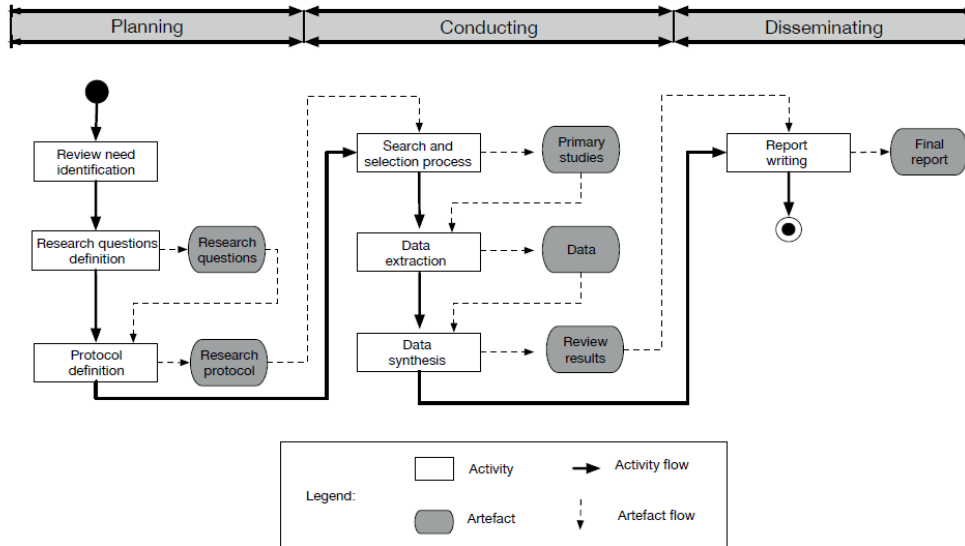
- Explain the methodology that you have used.
- Research questions
- Results discussion
- Answers to the Research questions
- Open issues + Opportunities

### • Mandatory

- First slide:
  - CMES subject, SLR report
  - Name of the students
  - year
- Your voices
- Use pictures to enhance your idea
- Use your own charts and tables from your performed analysis.

- See video examples provided in the SLR assignment.
- See Poster examples provided in the SLR assignment.

# SLR (6)



In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

## Example: PhD Thesis (Chapter 3)

### Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### For each student in the team

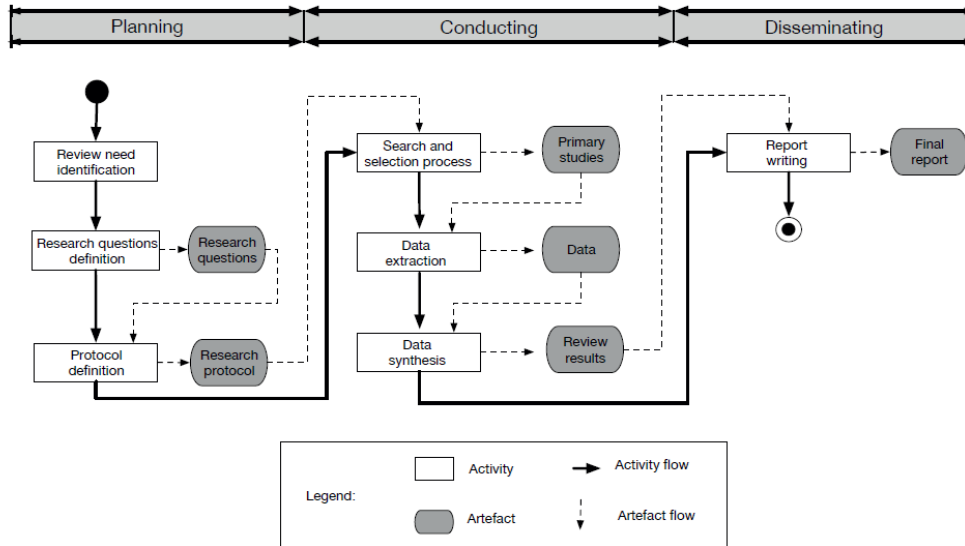
- 01. Search and save the title (doi) of the articles (minimum 30 articles)
  - 01.a. showballing procedure
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- 07. Presentation of the SLR process and results – Pecha Kucha presentation type (10 minutes)
- 08. Poster

### Turn in:

- One excel file containing:
  - Final list of selected papers included in your SLR as a team.
    - Excel file with one sheet containing the list (for each paper, year, title, authors, conference or journal, link of the online publication)
  - Data extraction form
    - Excel file with one sheet containing the table with the characteristics that you have chosen for each the included paper in the SLR.
  - Tabulated data
    - Excel file with one sheet containing the table with the result analysis.
  - Charts with your analysis
    - Excel file with one sheet (or multiple sheets) containing the performed analysis that contains the charts you have created based on your analysis.
- PDF file with the SLR report (use the provided template; you can update it based on your need)
- Video presentation of your SLR activity.
- Poster



# SLR (7)



In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the

## Example: PhD Thesis (Chapter 3)

### Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### For each student in the team

- Search and save the title (doi) of the articles (minimum 30 articles)
  - showballing procedure
- Read abstracts and reduce from 30 to 10 papers
- Read each of the 10 papers
  - create standardized data extraction form = all relevant information for each study, allowing you to examine and compare results.
  - produce 1 paragraph (approach, used method, dataset, obtained results) (3h\*10articles=30h)
- Summarizing table with the 10 articles
  - Tabulating extracting data
- Future work and opportunities
  - Discussions of results
  - Gaps, challenges, open issues
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- Report containing
  - Explain the methodology applied (all the steps and findings regarding various characteristics of the selected articles).
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- Presentation of the SLR process and results – Pecha Kucha presentation type (10 minutes)
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### Turn in:

- One excel file containing:
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    - Excel file with one sheet containing the table with the characteristics that you have chosen for each the included paper in the SLR.
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  - Charts with your analysis
    - Excel file with one sheet (or multiple sheets) containing the performed analysis that contains the charts you have created based on your analysis.
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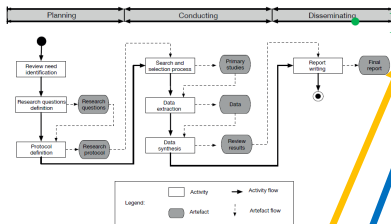


# SLR (8)

1200 XP – Report (Take Home Exam)

- Social Quests (Report and Presentation)

In this step, we aim to enlarge the set found by the automatic search from previous steps, through a snowballing activity [33]. Through the snowballing activity, we referred to each study and used its reference list to identify additional studies. Several potential studies were identified but after applying the



1200 XP

- 100: papers list + data extraction form
- 150: tabulated data
- 150: charts
- 150: methodology in the pdf report
- 150: paragraphs on the content of the papers
- 200: discussions+ open issues + opportunities
- 200 Pecha Kucha presentation
  - 100: methodology in short + rq+table+charts+answer to rq
  - 100: organization, content, slides, delivery
- 100 Poster

• Example: PhD Thesis (Chapter 3)

• Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

• For each student in the team

01. Search and save the title (doi) of the articles (minimum 30 articles)
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  - Final list of selected papers included in your SLR as a team.
    - Excel file with one sheet containing the list (for each paper, year, title, authors, conference or journal, link of the online publication)
  - Data extraction form
    - Excel file with one sheet containing the table with the characteristics that you have chosen for each the included paper in the SLR.
  - Tabulated data
    - Excel file with one sheet containing the table with the result analysis.
  - Charts with your analysis
    - Excel file with one sheet (or multiple sheets) containing the performed analysis that contains the charts you have created based on your analysis.
- PDF file with the SLR report (use the provided template; you can update it based on your need)
- Video presentation of your SLR activity.
- Poster



# SLR (9)

- SLR and Video Example by students
  - Discussed during the lecture (not everything is correct!)
  - 5 minutes → NOW 10 minutes
- Poster
  - 1 example on overleaf:
    - <https://www.overleaf.com/latex/templates/gemini-poster-theme/nzpspqjryjhx>
  - 1 example on pptx
    - <https://management.buffalo.edu/internal/communications-tools/templates/research-poster-template.html>
  - Define ones for your own need + UBB logo (+FMI)

## • Example: PhD Thesis (Chapter 3)

### • Team work

- Chosen Topic: the same for all students in the team
- Define Research Questions (RQ)
- Define Keyword and Search string

### • For each student in the team

- 01. Search and save the title (doi) of the articles (minimum 30 articles)
  - 01.a. showballing procedure
- 02. Read abstracts and reduce from 30 to 10 papers
- 03. Read each of the 10 papers
  - 03.a. create standardized data extraction form = all relevant information for each study, allowing you to examine and compare results.
  - 03.b. produce 1 paragraph (approach, used method, dataset, obtained results) (3h\*10articles=30h)
- 04. Summarizing table with the 10 articles
  - 04.a. Tabulating extracting data
- 05. Future work and opportunities
  - 05.a. Discussions of results
  - 05.b. Gaps, challenges, open issues
  - 05.c. Opportunities/Recommendations
- 06. Report containing
  - Explain the methodology applied (all the steps and findings regarding various characteristics of the selected articles).
  - The 10 paragraphs and the Summarizing table and Future work and opportunities.
- 07. Presentation of the SLR process and results – Pecha Kucha presentation type (10 minutes)
- 08. Poster

#### Turn in:

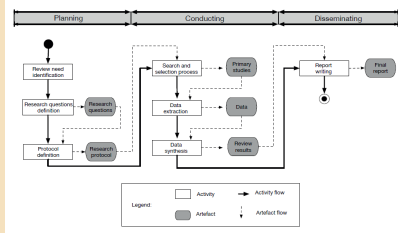
- One excel file containing:
  - Final list of selected papers included in your SLR as a team.
    - Excel file with one sheet containing the list (for each paper, year, title, authors, conference or journal, link of the online publication)
  - Data extraction form
    - Excel file with one sheet containing the table with the characteristics that you have chosen for each the included paper in the SLR.
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# CMES – Today

# Bring it All Together

## SLR



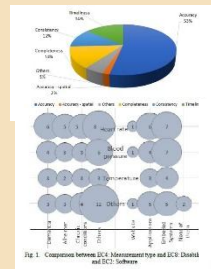
### Extraction form



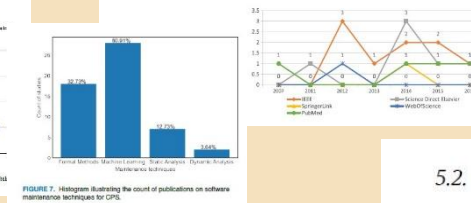
### Tabulating extracting data



- Team: 3-5 students/team
- 30 papers for each student => reduced to 10 papers (for each student)



### Charts



### Open issues Opportunities

#### V. IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

In this section, we identify new opportunities for future

#### 5.2. Discussion and open research topics

## SLR – turn in



### Turn in:

- One excel file containing:
  - Final list of selected papers included in your SLR as a team.
    - Excel file with one sheet containing the list (for each paper, year, title, authors, conference or journal, link of the online publication)
  - Data extraction form
    - Excel file with one sheet containing the table with the characteristics that you have chosen for each the included paper in the SLR.
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# Next Lecture

- Invited lecture
  - Synopsys

- Title:

- Virtual Prototyping for Software-Defined Vehicles

- Speaker:

- Ana Diaconu

- In attendance:

- Adrien Lorincz si Claudiu Ispas

- You are kindly asked to participate at these lectures, please send minimum 10 students from each semigroups.

- Fill in here the list of students:

- [https://ubbcluj.sharepoint.com/:w:/r/sites/2025\\_2026\\_Master\\_CMES/\\_layouts/15/Doc.aspx?sourcedoc=%7BE02DF2CF-96C5-4CFA-AC17-325537A94C62%7D&file=InvitedLectures\\_StudentParticipants\\_List.docx&action=default&mobileredirect=true](https://ubbcluj.sharepoint.com/:w:/r/sites/2025_2026_Master_CMES/_layouts/15/Doc.aspx?sourcedoc=%7BE02DF2CF-96C5-4CFA-AC17-325537A94C62%7D&file=InvitedLectures_StudentParticipants_List.docx&action=default&mobileredirect=true)

# Thank You For Your Attention!

- ExitTicket
- Mentimeter
  - menti.com
  - Code: ?

