POLS530 – Quantitative Research Methods

Instructor: Mert Moral

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Office Hours: By appointment only – via Zoom.[1] M 8:30-11:00am

Lectures: Lecture videos – on YouTube.

Discussions/Labs: Online meetings – via Zoom. R 08:40-11:30am.

Teaching Assistant: Yasemin Tosun.[2] By appointment only – via Skype (yasemintosun91). W 9:30-11:00am

Course Description

The purpose of this course is to introduce graduate students to quantitative research methods, particularly to the theory, application, and interpretation of the most commonly used regression methods in social sciences and political science.

Throughout the semester, we will continue focusing on the major topics in political methodology –i.e., research design, measurement, and causal inference– and communicating "what we think we know" to our audience. The main emphasis of this course, however, will be on theory testing, specifically on the application and interpretation of various regression methods, starting with ordinary least squares and briefly touching upon maximum likelihood estimation in the second half of the semester, while employing observational data on distinct social and political phenomena.

Although this course is designed to follow an applied approach, it assumes a working knowledge of linear and matrix algebra, probability theory, and elementary statistics to understand, apply, and interpret the technical concepts and methods you will learn throughout the semester.[3] As such, "Methods and Scope of Political Analysis" (POLS529) is a formal prerequisite and all students are expected to have read the assigned readings for POLS529 and acquired necessary software skills (i.e., Stata and LaTeX) before the start of the semester.

By the end of the semester, the students will be able to comprehend, and critically and constructively evaluate contemporary quantitative political science research, and will have acquired the necessary skills to design and execute their own quantitative study, and choose and apply the most suitable regression method/s, and the necessary foundation to learn more advanced concepts and methods in the future, either by themselves or in more advanced courses.

Course Outline and Important Dates

25.02	Overview & Introduction to Matrix Algebra	
04.03	Matrix Algebra & Linear Regression in Matrix Form	
11.03	Bivariate Regression & Interpretation	*First Meeting w/ the Instructor*

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[1] Please click on the hyperlink indicated with blue color to set up an appointment via Calendy.

[2] Yasemin Hoca is a Ph.D. candidate with great software, methodological, and teaching skills. Please try to benefit from her experience and skills as much as possible, especially when you have a question about the course content or requirements, and experience a software problem.

[3] If you are concerned with your preparedness for the course, I suggest skimming through Harvard University's Math (P)refresher to refresh your memory, or Moore and Siegel's book (see the "Textbook" section below) and accompanying video lectures for a more formal account of the mathematical concepts you will use in POLS530.

18.03	Multivariate Regression & Interpretation	
25.03	OLS Assumptions & Violations	**Article Review**
01.04	Regression Diagnostics & Heteroskedasticity	
08.04	Interactive Hypotheses & Linear Models I	*Second Meeting w/ the Instructor*
15.04	Interactive Linear Models II & Interpretation	
22.04	Distributions and Maximum Likelihood Estimation	*Third Meeting w/ the Instructor*
29.04	Models of Binary Data I	
06.05	Models of Binary Data II	
~~13.05~~	~~No class/Ramadan Feast~~	**Poster Presentation**
20.05	Models of Ordinal Data	
27.05	Models of Categorical Data	
03.06		**Replication/Extension Paper**

Course Requirements

- **Replication/Extension Paper**

  – The final assignment is composed of two parts –replication and extension– and will constitute 35% of the course grade.

  – The first part of the replication/extension paper requires you to replicate all analyses, tables, and figures in an article in the subfield of your interest, which is recently published in a reputable journal[4] and with available replication data.[5]

  – After successful replication of the empirical analyses in the article we will decide together, the second part of the assignment aims to improve the original analysis in **both** theoretical/substantive and methodological regards.

  – To make a theoretical contribution, you should inform your **own** expectations by the previous literature and derive a testable hypothesis/hypotheses. This requires becoming familiar with the previous literature on the topic and paying particular attention to theory building. The methodological improvement can be accomplished, for instance, by replacing the estimator with a more suitable one for the data at hand, changing the model specification/equation to improve the model–theory fit, introducing a main independent variable that you believe omitted from the original model, operationalizing some independent variable/s better, compiling new data to extend the sample to other cases or time periods...

  – During the second half of the semester, you should work on your replication/extension paper. To such end, you must schedule an appointment with me until March 11, 2021, to decide on a topic and an article. Please note that I may not approve replication/extension attempts that are not "feasible" given the limited scope of this course. I thus suggest finding and bringing more than a single article to our first meeting.

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[4]Assigned applied readings in the "Required Readings" section below (indicated with ∗) presume that your substantive interests fall onto either comparative politics or international relations. You are however free to pick any topic and article with a quantitative approach published in a reputable journal (see here for a list) for the article review and replication/extension assignment.

[5]If you cannot find the replication data of an article/book online –i.e., on the journal's or the author/s' personal website/repository, you can try contacting the (corresponding) author/s. Unfortunately, this rarely works in our field, especially for earlier research. I thus suggest looking for articles published in the last few years and journals with solid replication policies –e.g., AJPS, APSR, JOP, BJPS, PRQ.

– You should replicate all empirical analyses, and reproduce all tables and figures in the article we will decide upon before our second meeting on or before April 8, 2021. In our second meeting, I expect you to have a clearer expectation about what you will do for the second task –i.e., how to extend the models/empirical analyses in the original article.

– By April 22, 2021, all empirical analyses, tables, and figures that will be used in your poster should be finalized.

– Upon receiving feedback on your poster, you are expected to write a publishable quantitative study (short of long introductory, literature review, and concluding sections) as your final replication/extension paper (approx. 4000-4500 words).

- **Poster Presentation**

  – One of the primary goals of this course is to make you able to design and execute the empirical analyses of (admittedly an early draft of) a "publishable" quantitative study or a chapter of your MA thesis or Ph.D. dissertation, which would ideally be presented at a major national or international conference as part of your academic training and before submission for publication. All such international conferences (e.g., APSA, MPSA, ISA) organize poster sessions intended mainly for early-career faculty and graduate students. You will thus present your replication/extension assignments in poster form.

  – Your poster, due on May 20, 2021 (TBD), is expected to summarize the substantive and methodological contributions of your study to the related literature, research design, model, empirical findings, and conclusions.

  – You must incorporate the feedback you will receive from me into your final paper.

  – Your poster grade will be based on the overall quality of your poster, and your answers to questions that faculty members and other graduate students would ask.

  – A LaTeX template and a sample poster are available on SU Course+. More detailed instructions will be provided a week before the deadline.

- **Article Review Assignment**

  – For the article review assignment (approx. 1000 words), you will pretend to be a journal reviewer (you will become one before you know it) and critically evaluate an (already published) article (pretending it is still under review) in your field of interest for its theory, data, method, and presentation and interpretation of empirical findings.

  – The goal is to familiarize yourselves with current research, in both theoretical and methodological terms, on a topic that interests you, and to learn how to constructively and critically evaluate both the content and methodology of quantitative political science research.

- **Problem Sets**

  – You will receive a short problem set every two to three weeks starting with Week 3, which will be uploaded to SU Course+ after the online meeting and due the following online meeting.

  – In addition to a soft copy (PDF) of your assignment (which includes the Stata do file), your Stata do file (which should be sufficient to reproduce all your answers and related

tables, figures, and quantities of interest in your assignment) should also be emailed to your instructor and your TA before the online meeting.

– We will devote most online meetings to explaining and solving the problem sets. Hence, no late assignments will be accepted.

– I encourage collaborative work to solve the problem sets. However, this does not mean you can copy someone else's work. You must submit your own answers and code. I suggest starting to work on the problem sets as soon as you receive them and spending at least a day or two on your own before asking for help from others.[6]

– Although they will not be re-graded, you should always fix your errors by going over the graded problem sets and the solutions I will post to SU Course+ to learn from and not repeat the same mistakes. Note that grade penalties will accumulate in the case of persistent errors in your code, and the presentation and interpretation of your findings.

– Although I will provide you with problem set-specific instructions, the following ones apply to all:

- Attempt all questions –i.e., no incomplete assignments.

- Present your answers in numerical order and enumerate them properly.

- Ensure that your figures and tables look "professional" (i.e., of publication quality).

- Explain each step you take to answer the questions as well as your findings in an intuitive fashion.

- Report your (annotated) do file on the last page of your assignment.

Grading

– To receive a passing grade from the course, you **must** complete all requirements –i.e., all problem sets, article review, poster, and final replication/extension assignments.

– Assignments in turn constitute 35% (replication/extension assignment), 35% (problem sets), 10% (poster), 10% (article review), and 10% (attendance and participation) of your final grade.

– Grades will be given on a 100-points scale. Cumulative final grades will then be converted to letter grades at the end of the semester as follows: 85-100=A, 80-84=A-, 75-79=B+, 74-70=B, 65-69=B-, 60-64=C+, 55-59=C, 50-54=C-, 45-49=D+, 40-44=D, 0-39=F.

Textbooks

There are four textbooks we will use in POLS530. You should have the hard or soft copies of:

- Cameron, A. Colin, and Pravin K. Trivedi. 2005. Microeconometrics: Methods and Applications. Cambridge, NY: Cambridge University Press.

- King, Gary. 1998. Unifying Political Methodology: The Likelihood Theory of Statistical Inference. Ann Arbor, MA: University of Michigan Press.

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[6]To help you with software related problems, Yasemin Hoca and I will hold our office hours on two different days. Note that neither Yasemin Hoca nor I will answer your homework-related questions during weekends.

- Long, J. Scott. 1997. Regression Models for Categorical and Limited Dependent Variables. Thousand Oaks, CA: SAGE.

- Wooldridge, Jeffrey M. 2016. *Introductory Econometrics: A Modern Approach.* 6th Edition. Mason, OH: South-Western, Cengage Learning.

In addition, there are three books we will use mainly for application purposes of which the required chapters are uploaded to SU Course:

- Acock, Alan C. 2018. *A Gentle Introduction to Stata.* 6th Edition. College Station, TX: Stata Press.

- Cameron, A. Colin, and Pravin K. Trivedi. 2009. Microeconometrics Using Stata. College Station, TX: Stata Press.

- Long, J. Scott, and Jeremy Freese. 2014. Regression Models for Categorical Dependent Variables Using Stata. 3rd Edition. College Station, TX: Stata Press.

Lastly, I suggest having hard or soft copies of the following books in your libraries as supplementary readings and to learn about more advanced topics:

- Angrist, Joshua D. and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton University Press.

- Moore, Will H., and David A. Siegel. 2013. *A Mathematics Course for Political and Social Research.* Princeton: Princeton University Press.

- Wooldridge, Jeffrey M. 2010. *Econometric Analysis of Cross Section and Panel Data.* 2nd edition. Cambridge, MA: The MIT Press.

Required Readings

– Required readings for each week are provided below. You can access the journal articles by clicking on the hyperlinks indicated with blue color.[7]

– Relatively recent editions of the assigned books are available in the University bookstore (Homer) and reserved in the Information Center (IC) that can be checked out for only 24 hours to ensure that all students have a chance to read them in a timely manner.

– You need to have formal knowledge about and technical understanding of the foundation, derivation, and computation of various regression methods. This is something you will rarely do, if at all, on your own, but necessary to make sense of, present, and interpret your findings. Assigned technical/formal readings may seem inaccessible at first, and, therefore, require multiple readings (and/or from multiple sources[8]) and further clarification. Assigned journal articles (indicated with ∗), on the other hand, are generally more accessible and intended to provide you with an understanding of the application of the various methods you will learn each week.

– Learning statistical tools and methods is not very different from learning a new language. It takes dedication and time (and tears and sweat). You should not fall behind and leave your questions unanswered. If you do not understand a concept or method in your first reading, you should read

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[7]You should be connected to the University (wireless or virtual private) network to be able to do so.

[8]The "Required Readings" section below includes some optional readings (indicated with ◦), which you may find more accessible and useful than the recommended ones, especially for software-related or application purposes. Note that they are intended to be supplementary, rather than substitutable.

again (and again), and come to the online meeting with your questions ready. I also suggest going over lecture slides and re-reading especially the technical/formal readings after each lecture to fill in.

★ **Week 1 (25.02) - Overview and Introduction to Matrix Algebra**

– Cameron and Trivedi 2009 [App.A.1: 631-637].

– Wooldridge 2016 [App. D: 701-717].

★ **Week 2 (04.03) - Matrix Algebra and Linear Regression in Matrix Form**

– Cameron and Trivedi 2005 [Ch.4.1-4.4: 65-81].

– Wooldridge 2016 [App. E: 720-731].

○ Cameron and Trivedi 2009 [Ch.3-3.3.3: 71-82].

★ **Week 3 (11.03) - Bivariate Regression and Interpretation**

– Cameron and Trivedi 2009 [Ch.3.4-3.6.1: 84-102].

– Wooldridge 2016 [Ch. 2-2.5b: 20-48].

○ Acock [Ch.8: 246-274].

★ **Week 4 (18.03) - Multivariate Regression and Interpretation**

– Wooldridge 2016 [Chs. 3-4: 60-104, 105-141].

○ Acock [Ch.10.1-10.4: 335-343].

∗ Greenhill, Brian, Layna Mosley, and Aseem Prakash. 2009. "Trade-based Diffusion of Labor Rights: A Panel Study, 1986-2002." *American Political Science Review* 103 (4):669-90.

∗ Garand, James C., Ping Xu, and Belinda C. Davis. 2017. "Immigration Attitudes and Support for the Welfare State in the American Mass Public." *American Journal of Political Science* 61 (1):146-62.

★ **Week 5 (25.03) - OLS Assumptions and Violations**

– Cameron and Trivedi 2005 [Ch.8.1-8.4.3, 8.6-8.8: 259-275, 285-292].

– Wooldridge 2016 [Chs.5-6: 149-62, 166-96].

○ Acock [Ch.10.5-10.10: 344-373].

★ **Week 6 (01.04) - Regression Diagnostics and Heteroskedasticity**

– Wooldridge 2016 [Chs.8-9: 243-268, 274-303].

∗ Bloom, Pazit-Ben Nun, and Gizem Arikan. 2012. "A Two-edged Sword: The Differential Effect of Religious Belief and Religious Social Context on Attitudes towards Democracy." *Political Behavior* 34 (2):249-76.

∗ Clark, David H., Benjamin O. Fordham, and Timothy Nordstrom. 2011. "Preying on the Misfortune of Others: When Do States Exploit Their Opponents' Domestic Troubles?" *Journal of Politics* 73 (1):248-64.

⋆ **Week 7 (08.04) - Interactive Hypotheses and Linear Models**

– Cameron and Trivedi 2009 [Ch.10.6: 333-345].

– Wooldridge 2016 [Ch.7: 205-33].

∗ Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14 (1):63-82.

∗ Hainmueller, Jens, Jonathan Mummolo, and Yiqing Xu. 2018. "How Much Should We Trust Estimates from Multiplicative Interaction Models? Simple Tools to Improve Empirical Practice." *Political Analysis.* 1-30. doi:10.1017/pan.2018.46

⋆ **Week 8 (15.04) - Interactive Linear Models and Interpretation**

– Acock [Ch.10.11-10.12, 10.14: 374-92, 399-400].

– Long and Freese [Ch.4: 133-84].

∗ Banks, Antoine J., and Heather M. Hicks. 2019. "The Effectiveness of a Racialized Counterstrategy." *American Journal of Political Science* 63 (2):305-22.

∗ Larsen, Martin Vinaes, Frederik Hjorth, Peter Thisted Dinesen, and Kim Mannemar Sonderskov. 2019. "When Do Citizens Respond Politically to the Local Economy? Evidence from Registry Data on Local Housing Markets." *American Political Science Review* 113 (2):499-516.

⋆ **Week 9 (22.04) - Distributions and Maximum Likelihood Estimation**

– Cameron and Trivedi 2005 [App. A, Ch. 5: 943-56, 116-64].

– King [Ch.1-4: 1-94].

∘ Wooldridge [App. B: 722-52].

⋆ **Week 10 (29.04) - Models of Categorical Data: Binary Models I**

– Cameron and Trivedi 2005 [Ch. 14-14.3: 463-74].

– King [Ch.5-5.4: 97-115].

∘ Cameron and Trivedi 2009 [Ch.14-14.7.4: 445-64].

∗ Bapat, Navin A., and Sean Zeigler. 2016. "Terrorism, Dynamic Commitment Problems, and Military Conflict." *American Journal of Political Science* 60 (2):337-51.

∗ Weeks, Jessica L. 2012. "Strongmen and Straw Men: Authoritarian Regimes and the Initiation of International Conflict." *American Political Science Review* 106 (2):326-47.

⋆ **Week 11 (06.05) - Models of Categorical Data: Binary Models II**

– Long [Ch.3-4: 34-113].

– Wooldridge 2016 [Ch.17-17.1: 524-36].

∘ Long and Freese [Ch.6: 227-308].

∗ Koch, Michael T., and Stephen P. Nicholson. 2016. "Death and Turnout: The Human Costs of Warand Voter Participation in Democracies." *American Journal of Political Science* 60 (4):932-46.

∗ Wucherpfennig, Julian, Philipp Hunziker, and Lars-Erik Cederman. 2016. "Who Inherits the State? Colonial Rule and Postcolonial Conflict." *American Journal of Political Science* 60 (4):882-98.

⋆ **Week 13 (20.05) - Models of Ordinal Data**

– King [Ch.5.5-5.10: 97-132].

– Long [Ch.5: 114-47].

∘ Long and Freese [Ch.7-7.15: 309-70].

∗ Glaßel, Christian, and Katrin Paula. 2019. "Sometimes Less Is More: Censorship, News Falsification, and Disapproval in 1989 East Germany." *American Journal of Political Science* DOI: 10.1111/ajps.12501 (Online First).

∗ Kocher, Matthew Adam, Thomas B. Pepinsky, and Stathis N. Kalyvas. 2011. "Aerial Bombing and Counterinsurgency in the Vietnam War." *American Journal of Political Science* 55 (2): 201-18.

∗ Lupu, Yonatan. 2015. "Legislative Veto Players and the Effects of International Human Rights Agreements." *American Journal of Political Science* 59 (3):578-94.

⋆ **Week 14 (27.05) - Models of Categorical Data**

– Cameron and Trivedi 2005 [Ch. 15: 490-528].

– Long [Ch.6: 148-186].

∘ Long and Freese [Ch.8-8.11: 385-444].

∗ Moral, Mert, and Andrei Zhirnov. 2018. "Issue Voting as a Constrained Choice Problem." *American Journal of Political Science* 62 (2):280-95.

∗ Weber, Christopher R., Howard Lavine, Leonie Huddy, and Christopher M. Federico. 2014. "Placing Racial Stereotypes in Context: Social Desirability and the Politics of Racial Hostility." *American Journal of Political Science* 58 (1):63-78.

Software

– You will use Stata 16 SE in POLS530 for the problem sets and the replication/extension paper.[9] Before our first lecture, you should have a relatively recent version (any version after Stata 12 would be sufficient for estimation and prediction purposes, but I strongly suggest using Stata 15 or 16 for graphics.) installed on your personal computer. Installation instructions for Windows and MacOS[10] are available on the IT Department's website.

– All written assignments (including posters) should be compiled in LaTeX and submitted (either via email or to Turnitin) as PDF documents.

– There are many, free or paid, editors for TeX documents and compiling PDF files. I suggest using MikTeX on Windows and MacTeX on Mac, but you are free to use any other one.

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[9]You are free to use R as well. Yasemin Hoca and I will, however, not answer your software-related questions or provide software-specific solutions for the problem sets.

[10]Note the typo in the server address/link and ensure that you insert the correct link on the screenshot to the address field of your Finder. Please also ask Melike and Yasemin for help if you need further assistance.

– LaTeX templates and sample assignments, along with helpful tips are available on the course page. You can also find answers for most of your questions about LaTeX using its online forum.

Classroom/Online Meeting Policy and Attendance

– You must complete all assigned readings, have watched all lecture videos, and have your questions ready prior to the online meetings.

– Since most topics we will cover in this course are technical, assigned readings may require further explanation and clarification. We will thus follow an asynchronous/traditional lecture format for the online lectures that will be posted to YouTube each week. You are, however, strongly advised and will be encouraged to ask any and all questions you might have either as comments to the YouTube videos or during our online meetings.

– Not watching the lecture videos or missing the online meeting will have detrimental consequences later on. Nonetheless, stuff happens –especially during these turbulent times. Should scheduling conflicts arise, please inform me before they happen and note that, except for very rare, serious, and documentable instances, as graduate students, you should attend all lectures, and discussion/recitation, lab, and additional sessions. Otherwise, each missed lecture or session will result in a 5% grade penalty.

Syllabus

– This syllabus includes important information and administrative requirements about when, how, and what you should do to pass this course with a good grade. Please read it carefully and read it again before you email your teaching assistant or instructor.

– The PDF version of the syllabus on SU Course+ is the official syllabus for this course as it is updated periodically.[11] Please visit the course page to view its most recent version.

Course Page and e-mails

– After each online meeting I will post the lecture slides and weekly problem sets, if any, to the course page and the recorded Zoom videos to the shared Google Drive folder of the course.[12]

– Via SU Course+, I will also send you weekly announcements including the link/s to the lecture video/s uploaded to YouTube that you must watch before the online meetings.

– I will use your Sabanci University email to communicate administrative and other course-related issues with you. Please check your email regularly and, if necessary, reply in a timely manner.

– The fastest way to contact me is always via email. Please feel free to email me any time and about any **relevant** academic or non-academic issue.

Formatting, Writing, Late Submission, and Grade Appeals

– A list of course requirements and a tentative schedule are provided above. The exact schedule is, however, contingent on our progress and subject to change upon prior notice.

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[11]Course content, requirements, and policies are subject to change at the discretion of the instructor.

[12]The contents published on Google Drive and YouTube are created to be used and distributed within Sabancı University. The intellectual property rights of the content belong to the instructor and Sabancı University without any limitation. It cannot be used, copied, or reproduced to third parties without the prior written permission of the instructor.

– There are no margin or font requirements for written assignments. You should, however, turn in stapled, well-organized, and professional-looking papers (i.e., with your name, page numbers, proper citations, a properly formatted bibliography, and professional-looking tables and/or graphs).

– Please proofread your assignments for spelling, grammatical, and typographical errors.

– Note that I pay particular attention to writing and correct use of statistical parlance. Yasemin Hoca or I will provide you with annotated copies of your written assignments to improve your writing in both form and content, and you are expected to take our comments into account in your remaining assignments.[13]

– Late submissions for the replication/extension, article review, and poster assignments will be penalized by 1 point for each hour they are late. For the problem sets, late submissions will not be accepted.

– If you are unsatisfied with the grade you received, you may write a formal memorandum explaining your concerns and requesting that your grade be reviewed. I will respond to your inquiry in writing and will not discuss your grade with you in person.

Academic Honesty

– As its Research Misconduct Policy suggests, Sabancı University expects students to do their own work and acknowledge others when presenting their work.

– As a scholar-in-training, it is your responsibility to do your own work[14] and properly cite your sources using an appropriate format. Please refer to APSA's Style Manual for the preferred citation format for this class, especially if you are unsure about what to or how to cite.

– Minor penalties for citation and bibliographical errors will accumulate in the case of a consistent pattern, and any case of plagiarism and/or other sorts of academic dishonesty will not be tolerated.

– Note that all written assignments for this course will be considered written take-home exams according to the YÖK regulations, and, therefore, plagiarism in take-home exams will be considered cheating and pursued to the limits of University and YÖK rules.

Disability Accommodation

– Extra time for assignments and other necessary arrangements for students with disabilities will be made in conjunction with the Center of Individual and Academic Development and the instructor.

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[13]The "How to Write Package" folder on SU Course+ includes many helpful tips on writing for social scientists.

[14]You are encouraged to study together with your classmates, especially for the short assignments that require using Stata. However, this does not mean that you can submit the same work with no or minor modifications. You must always submit your **own work** and explain your code and/or findings in your own words.