GRADUATE WRITING CENTER

How to Reverse Outline a Document (STEM)

Reverse Outlining is a tool that can be used for both notetaking and revision. It is especially helpful for organizing and understanding longer academic writing projects (e.g., literature reviews, research statements) that develop an argument across multiple paragraphs. Understanding how to use reverse outlining for notetaking is key to understanding how to use it for revision.

What does it look like to take notes using a reverse outline?

Reverse outlining focuses on understanding an argument at the paragraph level. Taking notes that summarize the main idea of each paragraph can help you to follow the author's (or your own!) argument across a document. Consider this example from the introduction to Lorenz (1963) and note how the development of the argument can be traced through the main ideas of each paragraph:

[A] Certain hydrodynamical systems exhibit steady-state flow patterns, while others oscillate in a regular periodic fashion. Still others vary in an irregular, seemingly haphazard manner, and, even when observed for long periods of time, do not appear to repeat their previous history.

Paragraph A
Main Idea: Patterns in hydrodynamical systems may be steady state, periodic, or apparently irregular.

[B] These modes of behavior may all be observed in the familiar rotating-basin experiments, described by Fultz, et al. (1959) and Hide (1958). In these experiments, a cylindrical vessel containing water is rotated about its axis, and is heated near its rim and cooled near its center in a steady symmetrical fashion. Under certain conditions the resulting flow is as symmetric and steady as the heating which gives rise to it. Under different conditions a system of regularly spaced waves develops, and progresses at a uniform speed without changing its shape. Under still different conditions an irregular flow pattern forms, and moves and changes its shape in an irregular nonperiodic manner.

Paragraph B
Main Idea: Categorizing patterns in hydrodynamical systems in this way, including irregular, nonperiodic flow patterns, is supported by rotating-basin experiments conducted by Fultz et al. (1959) and Hide (1958).

[C] Lack of periodicity is very common in natural systems, and is one of the distinguishing features of turbulent flow. Because instantaneous turbulent flow patterns are so irregular, attention is often confined to the statistics of turbulence, which, in contrast to the details of turbulence, often behave in a regular well-organized manner. The short-range weather forecaster, however, is forced willy-nilly to predict the details of the large-scale turbulent eddies-the cyclones and anticyclones which continually arrange themselves into new patterns.

Paragraph C
Main Idea: Natural systems also include nonperiodic elements, which are often analyzable through time-averaged statistics, but challenging to predict at the detailed scale required for short-range weather forecasts

[D] Thus there are occasions when more than the statistics of irregular flow are of very real concern. In this study we shall work with systems of deterministic equations which are idealizations of hydro-dynamical systems. We shall be interested principally in nonperiodic solutions, i.e., solutions which never repeat their past history exactly, and where all approximate repetitions are of finite duration. Thus we shall be involved with the ultimate behavior of the solutions, as opposed to the transient behavior associated with arbitrary initial conditions. (p. 130)

Paragraph D
Main Idea: Because existing solutions cannot provide this detailed information, this paper will prioritize understanding long-term nonperiodic behavior.

Source: Lorenz, E.N. (1963). Deterministic Nonperiodic Flow. *Journal of the Atmospheric Sciences, 20*(March). 130-141.

How can you revise using a reverse outline?

When we write a longer document, we need to ensure that not only does the content of our document connect logically, but also that its organization helps guide our readers to understand our purpose.

After taking notes to reverse outline the *content* of a section of a paper, labeling the purpose of each paragraph can help you spot any repetitions, gaps, or other places where information is introduced out of order relative to your argument. Where the content or purpose of each paragraph does not connect effectively across the section(s), you can move or edit paragraphs to better support the aims of your paper. If you would like support with this process, a Graduate Writing Center consultation is a great next step.

To see an example of reverse outlining according to purpose, consider this example from the introduction to Lorenz (1963) and note how the structure of the argument can be seen in these notes.

[A] Certain hydrodynamical systems exhibit steady-state flow patterns, while others oscillate in a regular periodic fashion. Still others vary in an irregular, seemingly haphazard manner, and, even when observed for long periods of time, do not appear to repeat their previous history.

Paragraph A
Purpose: Introducing the topic of study, articulating categories that allow the paper to narrow to a more specific area of focus.

[B] These modes of behavior may all be observed in the familiar rotating-basin experiments, described by Fultz, et al. (1959) and Hide (1958). In these experiments, a cylindrical vessel containing water is rotated about its axis, and is heated near its rim and cooled near its center in a steady symmetrical fashion. Under certain conditions the resulting flow is as symmetric and steady as the heating which gives rise to it. Under different conditions a system of regularly spaced waves develops, and progresses at a uniform speed without changing its shape. Under still different conditions an irregular flow pattern forms, and moves and changes its shape in an irregular nonperiodic manner.

Paragraph B
Purpose: Offering evidence from the literature that supports the categorization in the preceding paragraph; Establishing a precedent of the topic of study in experimental contexts.

[C] Lack of periodicity is very common in natural systems, and is one of the distinguishing features of turbulent flow. Because instantaneous turbulent flow patterns are so irregular, attention is often confined to the statistics of turbulence, which, in contrast to the details of turbulence, often behave in a regular well-organized manner. The short-range weather forecaster, however, is forced willy-nilly to predict the details of the large-scale turbulent eddies-the cyclones and anticyclones which continually arrange themselves into new patterns.

Paragraph C
Purpose: Transitioning the discussion of the object of study (nonperiodic flow patterns) from experimental evidence to the focal question of the paper, motivated by a known shortcoming in current practice.

[D] Thus there are occasions when more than the statistics of irregular flow are of very real concern. In this study we shall work with systems of deterministic equations which are idealizations of hydro-dynamical systems. We shall be interested principally in nonperiodic solutions, i.e., solutions which never repeat their past history exactly, and where all approximate repetitions are of finite duration. Thus we shall be involved with the ultimate behavior of the solutions, as opposed to the transient behavior associated with arbitrary initial conditions. (p. 130)

Paragraph D
Purpose: Using signposting language to describe the specific focus, structure, and aims of the upcoming paper and to clarify its divergence from existing approaches.

Source: Lorenz, E.N. (1963). Deterministic Nonperiodic Flow. *Journal of the Atmospheric Sciences, 20*(March). 130-141.