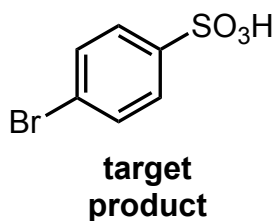


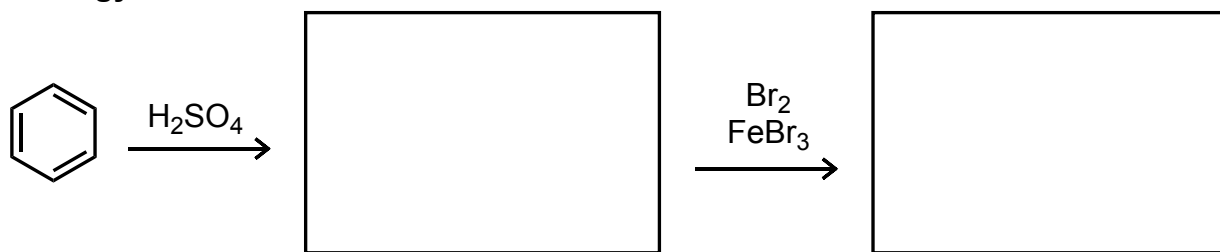
Retrosynthesis of Benzene Derivatives

1. Only one of the strategies below is successful in creating the target final product.

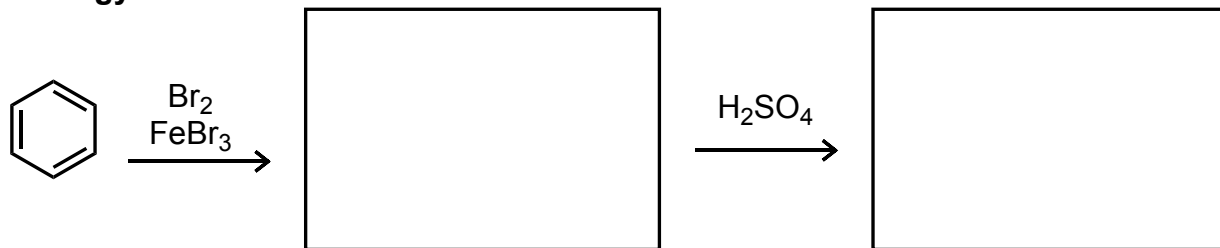


A. Provide the products in each scheme below.

Strategy A



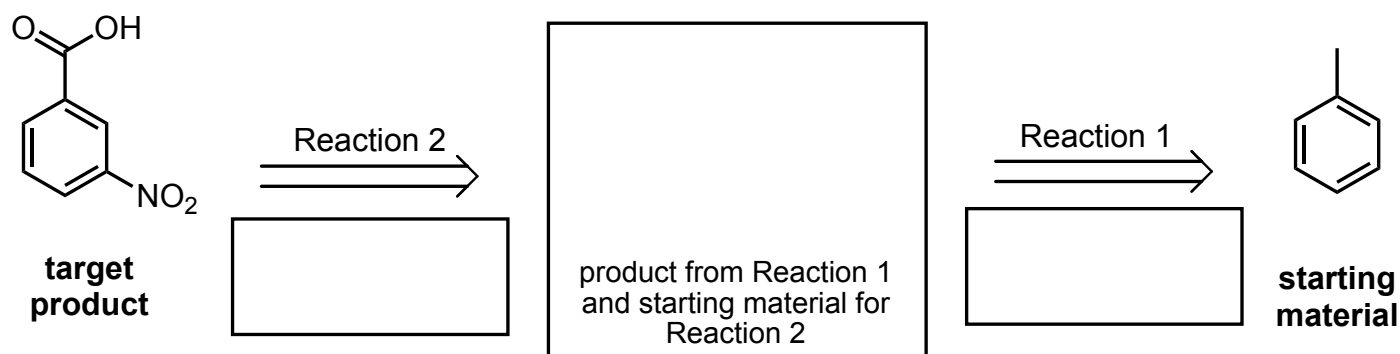
Strategy B



B. Which strategy forms the desired product?

C. In words, why does the other scheme not work for forming our desired product?

2. **Perform a retrosynthetic analysis** on the target product using the template and guiding questions, labeled as parts A-E.



A. What **new functional groups** are present?

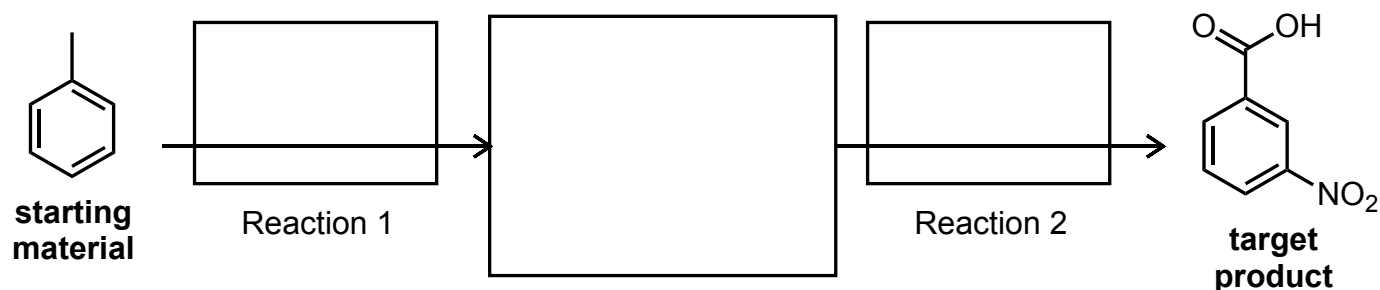
B. What is the **relationship** of the new groups (*ortho*, *meta*, or *para*)?

C. What are the **directing effects** of the new groups (*o/p*-director or *m*-director)?

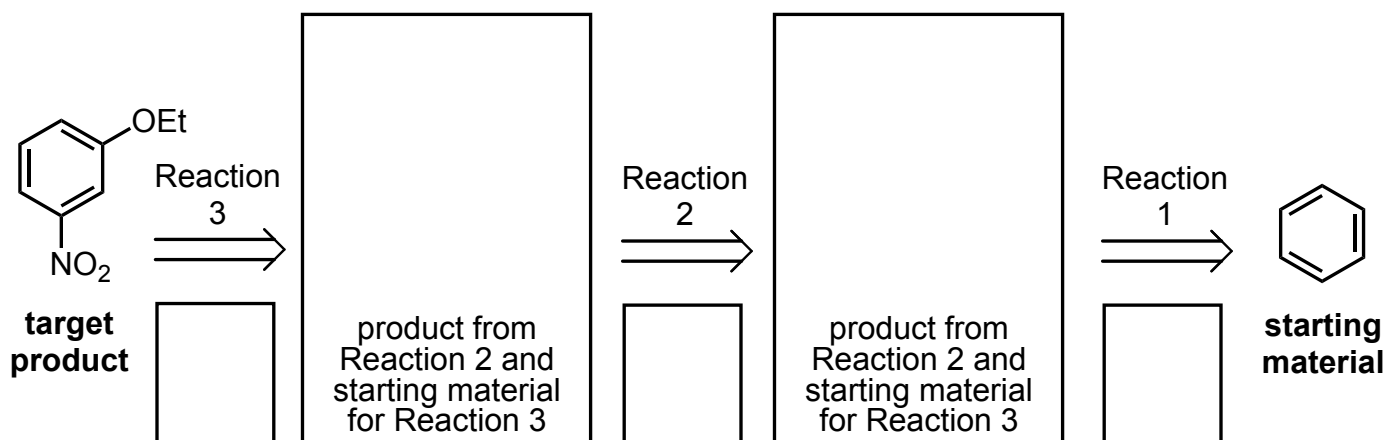
D. **What types of reactions** (e.g. EAS, NAS, benzylic reactions, oxidation, reduction) could introduce those functional groups?

E. Finally, what order of these reactions is needed to achieve the desired relationship?

Finally, use the answers to the questions above to **propose the full forward synthesis** associated with your proposed retrosynthesis.



3. Perform a retrosynthetic analysis on the target final product using the template and guiding questions, labeled as parts a-e.



A. What **new functional groups** are present?

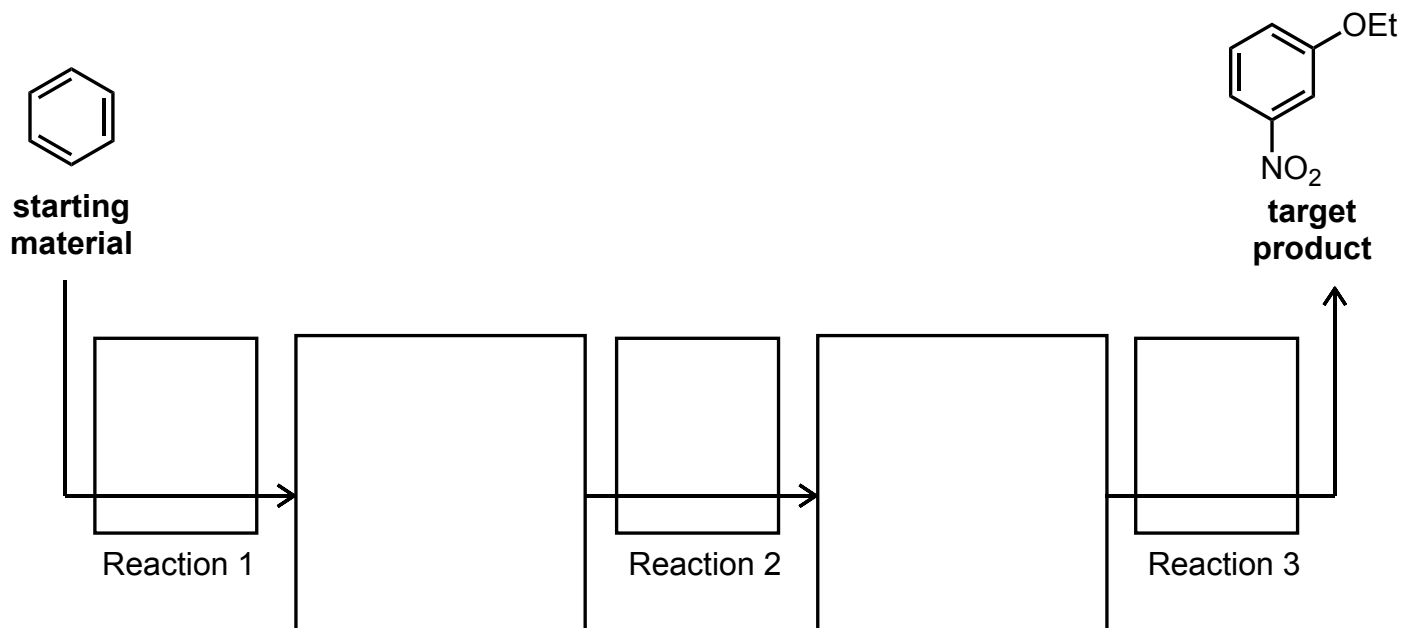
B. What is the **relationship** of the new groups (*ortho*, *meta*, or *para*)?

C. What are the **directing effects** of the new groups (*o/p*-director or *m*-director)?

D. **What types of reactions** (e.g. EAS, NAS, benzylic reactions, oxidation, reduction) could introduce those functional groups?

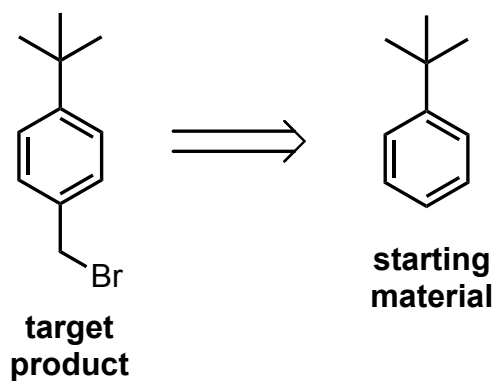
E. Finally, what order of these reactions is needed to achieve the desired relationship?

Finally, use the answers to the questions above to **propose the full forward synthesis** associated with your proposed retrosynthesis.



4. **Propose a successful forward synthetic route** for the formation of the shown target final product from the shown initial starting material.

Hint: You **cannot** install the bromine through a Friedel-Crafts reaction. Instead, you must use a benzylic reaction!



5. Propose a successful forward synthetic route for the formation of the shown target final product from the shown initial starting material.

Hint: This is a more complex tri-substituted product. Utilizing a retrosynthetic analysis of thinking "backwards", consider this question: **Which functional group had to be incorporated last?**

