COMPUTING METHODS IN HEP **Exercise 3** **Spring 2024**
(To be returned by 10:15 on Friday 9.2.)

1-2. **Write a C++ class** which contains a measurement in two dimensional space (x, y). Add member functions to return the value of the x and y coordinates, the error matrix ($M = \begin{pmatrix} \sigma_x^2 & \sigma_{xy} \\ \sigma_{xy} & \sigma_y^2 \end{pmatrix}$, σ's are the variances and the covariances), the distance $r = \sqrt{x^2 + y^2}$, its error and the significance $S = \frac{r}{error}$. **Compile the code into a library.** Write a test program to **test that the library works**.

Here the measurement is a single measurement, and the error matrix is coming from a separate measurement, which we use to estimate the uncertainty of our single measurement. A real world example of such a 2D measurement is the closest distance of a track to the primary vertex, which is called an 'impact parameter'.

Please push your results into your public git repository.