1) Calculate the expected number of events from the QCD background to the W->ev signal. Assuming the selection requirement for the electron are loose, the fake rate for electron is 0.05%, with an uncertainty of 50%. (The typical energy for an electron from the W is 45 GeV). Compare with the results found for the tevatron analysis. Explain the differences.
2) How much time will the tevatron need to collected 10fb-1 with a peak luminosity of 3.2×10^{-32}cm-2sg-1? How much time will take for CDF/D0 with a data taken effiency of 90%.?
3) Consider the decay in flight of a neutral meson of total energy E into two photons, ^{0}. If the two photons are measured to have energies E_1 and E_2 in the lab frame, what is the opening angle between them?
4) The Tevatron beam is not continuous but it has a bunch structure. Bunches of particles will collide every 350 nsec at 1.9TeV centre of mass energy with a luminosity (number of particles per sec per cm^2) of 10^{34} $cm^{-2}sec^{-1}$. The total inelastic proton-antiproton cross section at 1.9TeV is 50.7mb.
    a. I. Compute the number of interactions occurring per second as well as every time two bunches collide. These are called minimum bias interactions and are of no interest (background). The Higgs particle is expected to be produced at Tevatron mainly through the gluon-gluon production diagram ($gg \rightarrow H^0$) which has a cross section of about 0.68pb (at low Higgs mass, 120 GeV). One of the Higgs discovery channels involves searching for the Higgs decaying to two photons which has a probability (branching ratio) of $0.2\ 10^{-2}$. How many minimum bias events are produced for every Higgs event observed via the two photon channel if one ignores detector effects?

5) how would you look for the Higgs at the tevatron if your detector only have Tracking and muon Chambers at low and high Higgs mass region? Is it a viable solution?