

Lab 8 Decision tree - Classification

```
In [1]:
import from sklearn.datasets load_breast_cancer
data=load_breast_cancer()
X=data.data
y=data.target
print("Original Shape:",X.shape)
```

Original Shape: (569, 30)

```
In [2]:
import from sklearn.tree DecisionTreeClassifier
import from sklearn.tree DecisionTreeRegressor
import matplotlib.pyplot as plt
import from sklearn.metrics accuracy_score,precision_score,recall_score,f1_score
import from sklearn.model_selection train_test_split
```

```
In [3]:
def classify_and_evaluate(X,y,method_name='DT'):

X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.3,random_state=42)
clf=DecisionTreeClassifier()
clf.fit(X_train,y_train)
y_pred=clf.predict(X_test)

acc=accuracy_score(y_test,y_pred)
prec=precision_score(y_test,y_pred)
rec=recall_score(y_test,y_pred)
f1=f1_score(y_test,y_pred)

print(f"\n=== {method_name} Evaluation ===")
print(f"Accuracy: {acc:.4f}")
print(f"Precision: {prec:.4f}")
print(f"Recall: {rec:.4f}")
print(f"F1 Score: {f1:.4f}")

plt.figure(figsize=(6,5))
plt.scatter(range(len(y_test)),y_test,color='blue',label='Actual',alpha=0.7)

plt.scatter(range(len(y_pred)),y_pred,color='red',label='Predicted',alpha=0.7,mar
ker="x")
plt.title(f"{method_name} Actual vs Predicted")
plt.xlabel('Sample Index')
plt.ylabel('Class')
plt.legend()
plt.show()

return {"Method":method_name,"Accuracy":acc,"Precision":prec,"Recall":rec,"F1
Score":f1}
result_knn=classify_and_evaluate(X,y,method_name="DT")
```

```
=== DT Evaluation ===
Accuracy: 0.9240
```

Precision: 0.9524

Recall: 0.9259

F1 Score: 0.9390

