```python
import streamlit as st
import numpy as np
import pickle

# ================================
#     STREAMLIT PAGE CONFIG
# ================================
st.set_page_config(
    page_title="Ames Housing Prediction",
    page_icon="рцШ ",
    layout="centered"
)

st.markdown("""
    <h2 style='text-align:center; color:#4A90E2;'>
        рцШ  Ames Housing Price Prediction
    </h2>
    <p style='text-align:center; color:gray; font-size:17px;'>
        Input manual fitur в†' Prediksi harga rumah (USD & IDR)
    </p>
    <br>
""", unsafe_allow_html=True)

# ================================
#       LOAD MODEL PACKAGE
# ================================
try:
    package = pickle.load(open("RFREG_model.pkl", "rb"))
except Exception:
    st.error("вКЋ File RFREG_model.pkl tidak ditemukan. Pastikan file berada di folder yang sama dengan app.py.")
    st.stop()

# model & error metrics from notebook
model = package["model"]
MODEL_MAE_TRAIN = package["mae_train"]
MODEL_MAE_TEST = package["mae_test"]
MODEL_R2_TRAIN = package["r2_train"]
MODEL_R2_TEST = package["r2_test"]


# ================================
#  INPUT FITUR (VERTIKAL)
# ================================
st.header("рцЖ Input Fitur Rumah")

overall_qual = st.slider("Overall Quality (1 - 10)", 1, 10, 5)
overall_cond = st.slider("Overall Condition (1 - 9)", 1, 9, 5)
central_air = st.selectbox("Central Air", ["Yes", "No"])
gr_liv_area = st.number_input("Gr Liv Area (sqft)", 200, 7000, 1500)
total_bsmt_sf = st.number_input("Total Basement SF", 0, 3000, 800)

central_air_val = 1 if central_air == "Yes" else 0

# final feature vector
features = np.array([[overall_qual,
                      overall_cond,
                      gr_liv_area,
                      central_air_val,
                      total_bsmt_sf]])


# ================================
#          PREDIKSI
# ================================
st.markdown("---")
st.subheader(" Prediksi Harga")

predict_btn = st.button(" Prediksi Sekarang", use_container_width=True)

if predict_btn:

    price = model.predict(features)[0]

    # konversi USD в†' IDR
    usd_to_idr = 16000
    price_idr = price * usd_to_idr

    st.success("Prediksi berhasil!")

    st.markdown(f"""
        <h3 style='text-align:center; color:#4A90E2;'>
            Perkiraan Harga (USD): <b>${price:,.0f}</b><br>
            Perkiraan Harga (IDR): <b>Rp {price_idr:,.0f}</b>
        </h3>
    """, unsafe_allow_html=True)


    # ================================
    #     PENJELASAN PREDIKSI
    # ================================
    st.markdown("---")
    st.subheader(" Penjelasan Prediksi")

    st.markdown(f"""
**Interpretasi Berdasarkan Input:**

- **Overall Quality = {overall_qual}**
  Level ini {"tinggi" if overall_qual >= 7 else "sedang" if overall_qual >= 5 else "rendah"} dan sangat memengaruhi harga.

- **Overall Condition = {overall_cond}**
  Menjelaskan kondisi struktural & pemeliharaan rumah.

- **Gr Liv Area = {gr_liv_area:,} sqft**
  Rumah seluas ini termasuk kategori {"besar" if gr_liv_area > 2000 else "standar"}.

- **Central Air = {central_air}**
  Kehadiran AC sentral meningkatkan nilai rumah.

- **Total Basement SF = {total_bsmt_sf:,} sqft**
  Basement luas menambah area fungsional.

---

###  Akurasi Model (dibaca otomatis dari model)

- **MAE Train:** В± **${MODEL_MAE_TRAIN:,.0f}**
- **MAE Test:** В± **${MODEL_MAE_TEST:,.0f}**
- **RBI Train:** **{MODEL_R2_TRAIN:.2f}**
- **RBI Test:** **{MODEL_R2_TEST:.2f}**

**Apa artinya?**

- Prediksi model biasanya meleset sekitar **${MODEL_MAE_TEST:,.0f}** dari harga asli.
```

```
- Model menjelaskan sekitar **{MODEL_R2_TEST*100:.0f}%** variasi harga rumah.
- Prediksi adalah **estimasi**, bukan harga pasti вЂ" ada margin error yang wajar.

---

**Catatan tentang model:**
Random Forest mempelajari pola non-linear dari banyak pohon keputusan sehingga mampu memprediksi harga berdasarkan kombinasi fitur secara lebih fleksibel.
""")
```