Mean Arterial Pressure Calculator (version 1.0)
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Background and Operational Description

This program estimates a patient’s mean arterial pressure (MAP) given the systolic and diastolic pressures. A widely used approximation of the MAP is \( \frac{1}{3}P_{\text{systolic}} + \frac{2}{3}P_{\text{diastolic}} \). The units of the MAP is the same as those of the specific systolic and diastolic pressures.

User will be prompted to enter systolic and diastolic pressures in mm Hg and press a “Calculate” button to cause the calculation and display of the MAP. This also disables the input edit boxes until the “Clear” button is pressed. The reason for this behavior is to prevent the calculated MAP from getting out of synchronization with the input edit boxes.

In Matlab, there is no obvious way to clear the output in response to the user placing the focus on the input edit boxes. The GUI systems in other languages (like MFC/C++ and Eclipse/Java) can have callbacks activated in response to edit boxes receiving the focus.

User Interface Description

Three static text labels (sysLabel, diaLabel and mapLabel) that label the inputs and output.

Two edit boxes (sysEdit and diaEdit) for user input in mm Hg.

A static text control (mapText) for MAP output in mm Hg.

A push button (calcButton) that causes calculation and display of output and disabling of the input edit boxes when clicked.

A push button (otherButton) that clears and re-enables the input edit boxes and clears the output text box.

Algorithms

OpeningFcn

Set up application data storage for systolic, diastolic and mean arterial pressures \( (P_{\text{sys}}, P_{\text{dia}}, P_{\text{map}}) \) in handles structure.
sysEdit_Callback

Get edit box String, convert it to type double and store as Psys in handles structure. Create formatted echo text (sysStr) using sprintf. Set edit box String to echo text. Update guidata with new handles structure.

diaEdit_Callback

Get edit box String, convert it to type double and store as Pdia in handles structure. Create formatted echo text (diaStr) using sprintf. Set edit box String to echo text. Update guidata with new handles structure.

calcButton_Callback

Disable input edit boxes. Calculate and store MAP as Pmap in handles structure. Create formatted output text. Set output static text (mapText) String to formatted text. Update guidata with new handles structure.

otherButton_Callback

Reset output static text (mapText) String to blank text (empty string). Re-enable input edit boxes.
Source Code

0001 function varargout = mapCalc(varargin)
0002 % MAPCALC M-file for mapCalc.fig
0003 % _Snip (opening comments and initialization code deleted)...
0004 % --- Executes just before mapCalc is made visible.
0005 function mapCalc_OpeningFcn(hObject, eventdata, handles, varargin)
0006 % This function has no output args, see OutputFcn.
0007 % hObject    handle to figure
0008 % eventdata  reserved - to be defined in a future version of MATLAB
0009 % handles    structure with handles and user data (see GUIDATA)
0010 % varargin   command line arguments to mapCalc (see VARARGIN)
0011
0012 % Choose default command line output for mapCalc
0013 handles.output = hObject;
0014
0015 % Added Code: set up appdata storage of systolic and diastolic pressures.
0016 handles.Psys = 0.0; % Systolic pressure in mm Hg.
0017 handles.Pdia = 0.0; % Diastolic pressure in mm Hg.
0018 handles.Pmap = 0.0; % MAP in mm Hg, may be used later.
0019
0020 % Update handles structure
0021 guidata(hObject, handles);
0022
0023 % UIWAIT makes mapCalc wait for user response (see UIRESUME)
0024 uiwait(handles.figure1);
0025
0026 % --- Outputs from this function are returned to the command line.
0027 function varargout = mapCalc_OutputFcn(hObject, eventdata, handles)
0028 % varargout  cell array for returning output args (see VARARGOUT);
0029 % hObject    handle to figure
0030 % eventdata  reserved - to be defined in a future version of MATLAB
0031 % handles    structure with handles and user data (see GUIDATA)
0032
0033 % Get default command line output from handles structure
0034 varargout{1} = handles.output;
0035
0036 % --- Executes during object creation, after setting all properties.
0037 function sysEdit_CreateFcn(hObject, eventdata, handles);
0038 % hObject    handle to sysEdit (see GCBO)
0039 % eventdata  reserved - to be defined in a future version of MATLAB
0040 % handles    empty - handles not created until after all CreateFcns called
0041
0042 function sysEdit_CallBack(hObject, eventdata, handles)
0043 % hObject    handle to sysEdit (see GCBO)
0044 % eventdata  reserved - to be defined in a future version of MATLAB
0045 % handles    structure with handles and user data (see GUIDATA)
0046 % Hints: get(hObject,'String') returns contents of sysEdit as text
0047 % str2double(get(hObject,'String')) returns contents of sysEdit as a double
0048 % Get entered text and convert to double.
0049 handles.Psys = str2double(get(hObject,'String'));
0050
0051 % Create formated echo string.
0052 sysStr = sprintf('%g', handles.Psys);
0053
0054 % Echo the formated input.
0055 set(hObject, 'String', sysStr);
0056
0057 % Update central handles structure.
0058 guidata(hObject, handles);
0059
0060 % --- Executes during object creation, after setting all properties.
0061 function sysEdit_CreateFcn(hObject, eventdata, handles);
0062 % hObject    handle to sysEdit (see GCBO)
0063 % eventdata  reserved - to be defined in a future version of MATLAB
0064 % handles    empty - handles not created until after all CreateFcns called
0065
0066 % Hint: edit controls usually have a white background on Windows.
if ispc
    set(hObject, 'BackgroundColor', 'white');
else
    set(hObject, 'BackgroundColor', get(0, 'defaultUicontrolBackgroundColor'));
end

function diaEdit_Callback(hObject, eventdata, handles)
    % hObject    handle to diaEdit (see GCBO)
    % eventdata  reserved - to be defined in a future version of MATLAB
    % handles    structure with handles and user data (see GUIDATA)
    % Hints: get(hObject,'String') returns contents of diaEdit as text
    %        str2double(get(hObject,'String')) returns contents of diaEdit as a double
    % Get entered text and convert to double.
    handles.Pdia = str2double(get(hObject, 'String'));
    % Create formatted echo string.
    diaStr = sprintf('%g', handles.Pdia);
    % Echo the formatted input.
    set(hObject, 'String', diaStr);
    % Update central handles structure.
    guidata(hObject, handles);

function diaEdit_CreateFcn(hObject, eventdata, handles)
    % hObject    handle to diaEdit (see GCBO)
    % eventdata  reserved - to be defined in a future version of MATLAB
    % handles    empty - handles not created until after all CreateFcns called
    % Hint: edit controls usually have a white background on Windows.
    %       See ISPC and COMPUTER.
    if ispc
        set(hObject, 'BackgroundColor', 'white');
    else
        set(hObject, 'BackgroundColor', get(0, 'defaultUicontrolBackgroundColor'));
    end

function calcButton_Callback(hObject, eventdata, handles)
    % hObject    handle to calcButton (see GCBO)
    % eventdata  reserved - to be defined in a future version of MATLAB
    % handles    structure with handles and user data (see GUIDATA)
    % Disable input.
    set(handles.sysEdit, 'Enable', 'off');
    set(handles.diaEdit, 'Enable', 'off');
    % Calculate and save map.
    handles.Pmap = 0.333*handles.Psys + 0.667*handles.Pdia;
    % Create formatted output string.
    mapStr = sprintf('%.0f', handles.Pmap);
    % Display the formatted input.
    set(handles.mapText, 'String', mapStr);
    % Update central handles structure.
    guidata(hObject, handles);

function otherButton_Callback(hObject, eventdata, handles)
    % hObject    handle to otherButton (see GCBO)
    % eventdata  reserved - to be defined in a future version of MATLAB
0167 % handles structure with handles and user data (see GUIDATA)
0168
0169 % Clear output
0170 set(handles.mapText, 'String', '');
0171
0172 % Reenable inputs.
0173 set(handles.sysEdit, 'Enable', 'on');
0174 set(handles.diaEdit, 'Enable', 'on');