

# WUSS 2024

## Customizing SAS® Studio in SAS® Viya® – The Next Step

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## Developing a Custom Step for the KCLUS Procedure

1. Starting from SAS Drive, use the applications menu to proceed to **Develop Code and Flows**. From the menu bar, click **New** and select **Custom Step**.

### DATA Pane

2. The Custom Step area opens into the Designer with Page 1 appearing. On the properties panel, set the ID of the page to **data** and the label to **DATA**.
3. In the Control Library, scroll down to the Data area and drag **Input Table** to the DATA page. Set **ID** to **inputdata** and **Label** to **Select table for analysis**. Leave the check box next to **Required** selected.
4. Add two Column Selector items to the page. Set the following properties:

	Column Selector 1	Column Selector 2
ID	catvars	intvars
Label	Select categorical inputs	Select continuous inputs
Link to input table	(inputdata)	(inputdata)
Column Type	All types	Numeric

### OPTIONS Pane

5. In the Control Library, click **Add Page**. With this new page selected, set **ID** to **options** and **Label** to **OPTIONS** in the properties panel.
6. Add two Check Box items to the page. Set the following properties:

	Check Box 1	Check Box 2
ID	imputeint	imputecat
Label	Replace interval missing values with mean.	Replace nominal missing values with mode.

7. Add a radio button group to the page. Set **ID** to **radiocluster** and **Label** to **Number of clusters**. Click **Add Many** to add several items to the radio list. In the box that appears, enter **Specify number of clusters** and **Calculate number of clusters**, where each option appears on its own line. Click **OK**.
8. If the original default radio button is still present in the list, click the box in front of that option (in properties) and click the trash button.
9. Click the **Map Values** button to expand the options within the radio list. A new column named **Value** appears. On each line, change **Value** to **specify** and **calculate** respectively.
10. Set the default radio button to **Specify number of clusters**.
11. Add a text or numeric field to the page. Set **ID** to **numcluster** and **Label** to **Maximum number of clusters**. Change **Type** to **Numeric**. Set the default value to 4, the minimum value to 2, and the maximum value to 6.

12. Expand the **Dependencies** area. Under **Visibility**, type ["\$radiocluster","=", "specify"].

## OUTPUT Pane

13. In the Control Library, click **Add Page**. With this new page selected, set **ID** to **output** and **Label** to **OUTPUT**.

14. Add an output table to the page. Set **ID** to **outputdata** and **Label** to **Select location of output table**. Select the box for **Required**.

15. Go to the PROGRAM CODE area. Copy and paste the provided code into the Program area within the Custom Step Build area. You can also copy and paste the program code from the provided TXT file.

16. Save the step using the name **KCLUSExample**.

## PROGRAM CODE Area

The following program code should be copied into the Program area of the custom step. It is important that the IDs that were created within the Designer are exact as they are referenced in the program as macro variables.

```
*Creates the lists of categorical and interval inputs;

%let catvarslist=;
%let intvarslist=;

%macro predictors;
%do i=1 %to &catvars_count;
    %let catvarslist = &catvarslist &&catvars_&i._name;
%end;
%do j=1 %to &intvars_count;
    %let intvarslist = &intvarslist &&intvars_&j._name;
%end;
%mend;

%predictors;
```

```
*Creates the PROC KCLUS statement;

%let proc=proc kclus data=&inputdata distance=Euclidean
    distancenom=binary ;

%macro procline;
    %if (&imputeint) %then %do; %let proc = &proc impute=mean;
%end;
```

```

    %if (&imputecat) %then %do; %let proc = &proc imputenom=mode;
%end;
    %if (&radiocluster = specify) %then %do; %let proc = &proc
        maxclusters=&numcluster; %end;
    %if (&radiocluster = calculate) %then %do; %let proc = &proc
        noc=abc(minclusters=2) maxclusters=10; %end;
%mend;

%procline;

&proc;
    input &intvarslist / level=interval;
    input &catvarslist / level=nominal;
    score out=&outputdata copyvars=( _all_ );
run;

```

## PROMPT UI

The following UI code is generated as items are added to the Designer. This code can be copied into the Prompt UI area of the custom step. After they are copied, the corresponding items appear in the Designer.

```

{
  "showPageContentOnly": true,
  "pages": [
    {
      "id": "data",
      "type": "page",
      "label": "DATA",
      "children": [
        {
          "id": "inputdata",
          "type": "inputtable",
          "label": "Select table for analysis",
          "required": true,
          "placeholder": "",
          "visible": ""
        },
        {
          "id": "catvars",
          "type": "columnselector",
          "label": "Select categorical inputs",
          "order": false,
          "columntype": "a",
          "max": null,
          "min": null,
          "visible": "",
          "table": "inputdata"
        }
      ]
    }
  ]
}

```

```

        {
            "id": "intvars",
            "type": "columnselector",
            "label": "Select continuous inputs",
            "order": false,
            "columnntype": "n",
            "max": null,
            "min": null,
            "visible": "",
            "table": "inputdata"
        }
    ],
    {
        "id": "options",
        "type": "page",
        "label": "OPTIONS",
        "children": [
            {
                "id": "imputeint",
                "type": "checkbox",
                "label": "Replace interval missing values
with mean.",
                "visible": ""
            },
            {
                "id": "imputecat",
                "type": "checkbox",
                "label": "Replace nominal missing values
with mode.",
                "visible": ""
            },
            {
                "id": "radiocluster",
                "type": "radiogroup",
                "label": "Number of clusters:",
                "items": [
                    {
                        "value": "specify",
                        "label": "Specify number of
clusters"
                    },
                    {
                        "value": "calculate",
                        "label": "Calculate number of
clusters"
                    }
                ]
            },
            {
                "visible": ""
            }
        ]
    }
]

```

```

        },
        {
            "id": "numcluster",
            "type": "numberfield",
            "label": "Maximum number of clusters",
            "placeholder": "",
            "required": false,
            "max": 6,
            "min": 2,
            "excludemin": false,
            "excludemax": false,
            "visible": [
                "$radiocluster",
                "=",
                "specify"
            ]
        }
    ],
    },
    {
        "id": "output",
        "type": "page",
        "label": "OUTPUT",
        "children": [
            {
                "id": "outputdata",
                "type": "outputtable",
                "label": "Select location of output
table.",
                "required": true,
                "placeholder": "",
                "visible": ""
            }
        ]
    }
],
"values": {
    "inputdata": {
        "library": "",
        "table": ""
    },
    "catvars": [],
    "intvars": [],
    "imputeint": false,
    "imputecat": false,
    "radiocluster": {
        "value": "specify",
        "label": "Specify number of clusters"
    }
},

```

```
    "numcluster": 4,  
    "outputdata": {  
      "library": "",  
      "table": ""  
    }  
  }  
}
```