BOS WORKSHOP

STYLE CREATION — FULL EXAMPLES

Windows, Doors & Fixed Panels — Step by Step

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"System haimuulizi fundi ahesabu — inamwambia fundi akateje."

5 Complete Examples: Casement, Sliding, Fixed Panel, Hinged Door, Variable Window
Each: Prerequisites → Drawing → POS Input → Calculation → Cutting List

JINSI YA KUSOMA EXAMPLES HIZI

Kila example inafuata hatua sawa: prerequisites → drawing (lines + shapes) → POS input → formula evaluation chain → cutting list.

Alama za Formula:

- **null** — hakuna formula, system inatumia W au H kulingana na position (FRAME TU)
- **h01 - 9** — chukua length ya line h01, punguza 9cm
- **(w01 + 1) / 2** — chukua length ya line w01, ongeza 1, gawanya 2
- **Variable (X, Y, Z)** — user anaingiza thamani wakati wa POS

Endpoint Types:

- **Mater-Mater**: Frame to frame (outer profiles)
- **Mater-Square**: Frame to joint (frame meets internal divider)
- **Square-Square**: Joint to joint (internal profiles)

Null Rule:

■ **Ni FRAME TU inayoruhusiwa formula = null. Position (width/height) inaambia system itumie W au H.**

MFANO 1: CASEMENT WINDOW — Panels 2

Window ya kawaida yenye panels mbili zinazofunguka nje. Frame ya nje, sashes mbili, mullion katikati, glass panes mbili, mosquito nets.

Step 0 — Prerequisites

Item	Value	Maelezo
Style Type	Window	Bidhaa ni window
Material Type	Aluminium	Profiles zote ni aluminium
Material Group	ALU-CAS-01	Group: frame, sash, mullion, glass, net, accessories

Materials ndani ya Group ALU-CAS-01:

- ALU-FRAME-60: Outer frame profile 60mm, stock bar 6.0m, 8,500/m
- ALU-SASH-45: Sash profile 45mm, stock bar 6.0m, 7,200/m
- ALU-MULL-40: Mullion profile 40mm, stock bar 6.0m, 6,800/m
- GLASS-5MM: Clear glass 5mm, sheet 3.0m x 2.0m, 18,000/sheet
- NET-FIBER: Fiberglass net, roll 1.2m x 30m, 45,000/roll

Steps 1-2 — Drawing (Lines + Shapes)

Line	Profile	Formula	Offcut	Pos	Endpoints	Var?
w01	ALU-FRAME-60	null	10cm	width	Mater-Mater	No
w02	ALU-FRAME-60	null	10cm	width	Mater-Mater	No
h01	ALU-FRAME-60	null	10cm	height	Mater-Mater	No
h02	ALU-FRAME-60	null	10cm	height	Mater-Mater	No
h03	ALU-MULL-40	`h01 - 9`	7cm	height	Sq-Sq	No
w03	ALU-SASH-45	`(w01+1)/2`	7cm	width	Mater-Sq	No
w04	ALU-SASH-45	`(w01+1)/2`	7cm	width	Mater-Sq	No
h04	ALU-SASH-45	`h01 - 9`	7cm	height	Mater-Sq	No
h05	ALU-SASH-45	`h01 - 9`	7cm	height	Mater-Sq	No

w01,w02 = frame juu/chini. h01,h02 = frame kushoto/kulia. h03 = mullion katikati. w03,w04 = sash width. h04,h05 = sash height.

Shape	Material	Type	Width Formula	Height Formula	Clear
glass_L	GLASS-5MM	Area	`w03 - 3`	`h04 - 3`	3mm
glass_R	GLASS-5MM	Area	`w03 - 3`	`h05 - 3`	3mm
net_L	NET-FIBER	Cut	`w03 - 2`	`h04 - 2`	N/A
net_R	NET-FIBER	Cut	`w03 - 2`	`h05 - 2`	N/A

Step 3 — POS: Style="Casement 2P" → Variable? No → Input: W=140cm x H=201cm

Step 4 — Calculation Chain

Round 1 — Null formulas (frames get W or H):

Line	Formula	Substitution	Length	+Offcut	Cut Len

w01	`null→W`	W=140	140	+10	**150cm**
w02	`null→W`	W=140	140	+10	**150cm**
h01	`null→H`	H=201	201	+10	**211cm**
h02	`null→H`	H=201	201	+10	**211cm**

Round 2 — Formulas referencing null lines:

Line	Formula	Substitution	Length	+Offcut	Cut Len
h03	`h01-9`	201-9	192	+7	**199cm**
w03	`(w01+1)/2`	(140+1)/2	70.5	+7	**77.5cm**
w04	`(w01+1)/2`	(140+1)/2	70.5	+7	**77.5cm**
h04	`h01-9`	201-9	192	+7	**199cm**
h05	`h01-9`	201-9	192	+7	**199cm**

Fill shapes:

Line	Formula	Substitution	Length	+Offcut	Cut Len
glass_L	`w03-3,h04-3`	70.5-3, 192-3	-	N/A	**67.5x189**
glass_R	`w03-3,h05-3`	70.5-3, 192-3	-	N/A	**67.5x189**
net_L	`w03-2,h04-2`	70.5-2, 192-2	-	N/A	**68.5x190**
net_R	`w03-2,h05-2`	70.5-2, 192-2	-	N/A	**68.5x190**

Step 5 — Cutting List (Fundi Anapokea Hii)

Profile/Material	Pieces	Cut Len	Qty	Stock	Bars
ALU-FRAME-60 (W)	w01, w02	**150cm**	2	6.0m bar	**1 bar**
ALU-FRAME-60 (H)	h01, h02	**211cm**	2	6.0m bar	**1 bar**
ALU-MULL-40	h03	**199cm**	1	6.0m bar	**1 bar**
ALU-SASH-45 (W)	w03, w04	**77.5cm**	4	6.0m bar	**1 bar**
ALU-SASH-45 (H)	h04, h05	**199cm**	4	6.0m bar	**2 bars**
GLASS-5MM	glass L+R	**67.5x189cm**	2	300x200	**1 sheet**
NET-FIBER	net L+R	**68.5x190cm**	2	120cm roll	**cut pcs**

■ **Total bars: 2 frame + 3 sash + 1 mullion = 6 bars + 1 glass sheet + net**

MFANO 2: SLIDING WINDOW — Panels 2

Window inayoteleza. Sash width = W/2 + overlap (panels zinaslide juu ya nyingine). Hakuna mullion. Ina interlock profiles ambapo panels zinakutana.

Step 0

- Style Type: **Window** | Material Type: **Aluminium** | Group: **ALU-SLD-01**
- ALU-TRACK-70: Sliding track frame 70mm, bar 6.0m | ALU-SLDSASH-50: Sash 50mm, bar 6.0m
- ALU-INTER-25: Interlock 25mm, bar 6.0m | GLASS-5MM: sheet 3.0x2.0m

Drawing

Line	Profile	Formula	Offcut	Pos	Endpoints	Var?
w01	ALU-TRACK-70	null	10cm	width	Mater-Mater	No
w02	ALU-TRACK-70	null	10cm	width	Mater-Mater	No
h01	ALU-TRACK-70	null	10cm	height	Mater-Mater	No
h02	ALU-TRACK-70	null	10cm	height	Mater-Mater	No
w03	ALU-SLDSASH-50	w01/2+4	7cm	width	Mater-Mater	No
w04	ALU-SLDSASH-50	w01/2+4	7cm	width	Mater-Mater	No
h03	ALU-SLDSASH-50	h01-7	7cm	height	Mater-Mater	No
h04	ALU-SLDSASH-50	h01-7	7cm	height	Mater-Mater	No
h05	ALU-INTER-25	h01-7	5cm	height	Mater-Mater	No
h06	ALU-INTER-25	h01-7	5cm	height	Mater-Mater	No

Tofauti: w03 = w01/2+4 (half + 4cm sliding overlap). Interlock h05/h06 = where panels meet.

Shape	Material	Type	Width Formula	Height Formula	Clear
glass_L	GLASS-5MM	Area	w03-4	h03-4	4mm
glass_R	GLASS-5MM	Area	w04-4	h04-4	4mm

POS: W=180cm x H=150cm

Calculation:

Line	Formula	Substitution	Length	+Offcut	Cut Len
w01	null→W	180	180	+10	**190cm**
w02	null→W	180	180	+10	**190cm**
h01	null→H	150	150	+10	**160cm**
h02	null→H	150	150	+10	**160cm**
w03	w01/2+4	180/2+4=94	94	+7	**101cm**
w04	w01/2+4	94	94	+7	**101cm**
h03	h01-7	150-7=143	143	+7	**150cm**
h04	h01-7	143	143	+7	**150cm**
h05	h01-7	143	143	+5	**148cm**
h06	h01-7	143	143	+5	**148cm**

Cutting List:

Profile/Material	Pieces	Cut Len	Qty	Stock	Bars
ALU-TRACK-70 (W)	w01,w02	**190cm**	2	6.0m	**1 bar**
ALU-TRACK-70 (H)	h01,h02	**160cm**	2	6.0m	**1 bar**
ALU-SLDSASH-50 (W)	w03,w04	**101cm**	4	6.0m	**1 bar**
ALU-SLDSASH-50 (H)	h03,h04	**150cm**	4	6.0m	**2 bars**
ALU-INTER-25	h05,h06	**148cm**	2	6.0m	**1 bar**
GLASS-5MM	both	**90x139cm**	2	300x200	**1 sheet**

MFANO 3: FIXED PANEL — Haifunguki

Panel isiyofunguka. Rahisi zaidi: frame + glazing bead + glass. Hakuna sash, mullion, au interlock. Mfano: showcase window, skylight.

Step 0

- Style Type: **Fixed** | Material Type: **Aluminium** | Group: **ALU-FIX-01**
- ALU-FIXFRAME-55: Fixed frame 55mm, bar 6.0m | ALU-BEAD-15: Glazing bead 15mm, bar 6.0m | GLASS-6MM: 6mm glass, sheet 3x2m

Drawing (Simple!)

Line	Profile	Formula	Offcut	Pos	Endpoints	Var?
w01	ALU-FIXFRAME-55	null	10cm	width	Mater-Mater	No
w02	ALU-FIXFRAME-55	null	10cm	width	Mater-Mater	No
h01	ALU-FIXFRAME-55	null	10cm	height	Mater-Mater	No
h02	ALU-FIXFRAME-55	null	10cm	height	Mater-Mater	No
w03	ALU-BEAD-15	w01-6	5cm	width	Sq-Sq	No
w04	ALU-BEAD-15	w01-6	5cm	width	Sq-Sq	No
h03	ALU-BEAD-15	h01-6	5cm	height	Sq-Sq	No
h04	ALU-BEAD-15	h01-6	5cm	height	Sq-Sq	No

Shape	Material	Type	Width Formula	Height Formula	Clear
glass_1	GLASS-6MM	Area	w01-8	h01-8	4mm

POS: W=100cm x H=120cm

Line	Formula	Substitution	Length	+Offcut	Cut Len
w01	null→W	100	100	+10	**110cm**
w02	null→W	100	100	+10	**110cm**
h01	null→H	120	120	+10	**130cm**
h02	null→H	120	120	+10	**130cm**
w03	w01-6	100-6=94	94	+5	**99cm**
w04	w01-6	94	94	+5	**99cm**
h03	h01-6	120-6=114	114	+5	**119cm**
h04	h01-6	114	114	+5	**119cm**
glass_1	w01-8,h01-8	92x112	-	N/A	**92x112cm**

Cutting List:

Profile/Material	Pieces	Cut Len	Qty	Stock	Bars
ALU-FIXFRAME-55 (W)	w01,w02	**110cm**	2	6.0m	**1 bar**
ALU-FIXFRAME-55 (H)	h01,h02	**130cm**	2	6.0m	**1 bar**
ALU-BEAD-15 (W)	w03,w04	**99cm**	2	6.0m	**1 bar**
ALU-BEAD-15 (H)	h03,h04	**119cm**	2	6.0m	**1 bar**
GLASS-6MM	glass_1	**92x112cm**	1	300x200	**1 sheet**

■ **Rahisi zaidi: lines 8, shape 1. Total: 2 frame bars + 2 bead bars + 1 glass sheet.**

MFANO 4: HINGED DOOR — Panel 1 (Glass + Board)

Mlango unaofunguka kwa hinges. Style Type = DOOR. Tofauti kubwa: ina threshold (kizingiti chini, profile tofauti/nzito). Door ina glass juu na board chini, imetenganishwa na mid-rail.

Step 0

- Style Type: **Door** | Material Type: **Aluminium** | Group: **ALU-DOOR-01**
- ALU-DFRAME-65: Door frame 65mm, bar 6.5m | ALU-THRESH-80: Threshold 80mm, bar 6.5m
- ALU-DSASH-50: Door sash 50mm, bar 6.5m | GLASS-5MM | BOARD-3MM-WHT: White board 3mm, sheet 2.4x1.2m

Drawing

Line	Profile	Formula	Offcut	Pos	Endpoints	Var?
w01	ALU-DFRAME-65	null	10cm	width	Mater-Mater	No
w02	ALU-THRESH-80	null	10cm	width	Mater-Mater	No
h01	ALU-DFRAME-65	null	10cm	height	Mater-Mater	No
h02	ALU-DFRAME-65	null	10cm	height	Mater-Mater	No
w03	ALU-DSASH-50	w01-7	7cm	width	Sq-Sq	No
w04	ALU-DSASH-50	w01-7	7cm	width	Sq-Sq	No
h03	ALU-DSASH-50	h01-11	7cm	height	Mater-Sq	No
h04	ALU-DSASH-50	h01-11	7cm	height	Mater-Sq	No
w05	ALU-DSASH-50	w01-7	7cm	width	Sq-Sq	No

w02 = threshold (heavier profile). w05 = mid-rail (divides glass from board). h03/h04: h01-11 = extra deduction for door frame + threshold.

Shape	Material	Type	Width Formula	Height Formula	Clear
glass_top	GLASS-5MM	Area	w03-3	h03*0.6	3mm
board_bot	BOARD-3MM	Area	w03-3	h03*0.4-5	N/A

Glass = 60% ya sash height (juu), Board = 40% minus mid-rail (chini).

POS: W=90cm x H=220cm

Line	Formula	Substitution	Length	+Offcut	Cut Len
w01	null→W	90	90	+10	**100cm**
w02 thresh	null→W	90	90	+10	**100cm**
h01	null→H	220	220	+10	**230cm**
h02	null→H	220	220	+10	**230cm**
w03	w01-7	90-7=83	83	+7	**90cm**
w04	w01-7	83	83	+7	**90cm**
h03	h01-11	220-11=209	209	+7	**216cm**
h04	h01-11	209	209	+7	**216cm**
w05 rail	w01-7	83	83	+7	**90cm**
glass_top	80x125	83-3, 209*0.6	-	N/A	**80x125cm**
board_bot	80x79	83-3, 209*0.4-5	-	N/A	**80x79cm**

Cutting List:

Profile/Material	Pieces	Cut Len	Qty	Stock	Bars
ALU-DFRAME-65 (W)	w01	**100cm**	1	6.5m	**1 bar**
ALU-THRESH-80	w02	**100cm**	1	6.5m	**1 bar**
ALU-DFRAME-65 (H)	h01,h02	**230cm**	2	6.5m	**1 bar**
ALU-DSASH-50 (W)	w03,w04,w05	**90cm**	3	6.5m	**1 bar**
ALU-DSASH-50 (H)	h03,h04	**216cm**	2	6.5m	**1 bar**
GLASS-5MM	glass_top	**80x125cm**	1	300x200	**1 sheet**
BOARD-3MM-WHT	board_bot	**80x79cm**	1	240x120	**1 sheet**

MFANO 5: VARIABLE WINDOW — Na Variable X

Window yenye sehemu isiyokuwa standard — mfano triangular/trapezoid top. Line moja+ ina is_variable=Yes, kwa hiyo system inaficha formula inputs na POS inataka user aingize X (au Y, Z) pamoja na W x H.

Step 0

- Style Type: **Window** | Material Type: **UPVC** (mfano tofauti!) | Group: **UPVC-VAR-01**
- UPVC-FRAME-70: UPVC frame 70mm, bar 6.0m | UPVC-SASH-60: UPVC sash 60mm, bar 6.0m | GLASS-5MM

Drawing

Window ina fixed top section (height = X, inapimwa site) na casement bottom.

Line	Profile	Formula	Offcut	Pos	Endpoints	Var?
w01	UPVC-FRAME-70	null	10cm	width	Mater-Mater	No
w02	UPVC-FRAME-70	null	10cm	width	Mater-Mater	No
h01	UPVC-FRAME-70	null	10cm	height	Mater-Mater	No
h02	UPVC-FRAME-70	null	10cm	height	Mater-Mater	No
w03	UPVC-FRAME-70	w01-6	7cm	width	Sq-Sq	No
h03	UPVC-FRAME-70	X	7cm	height	Sq-Sq	**YES**
w04	UPVC-SASH-60	w01-6	7cm	width	Sq-Sq	No
w05	UPVC-SASH-60	w01-6	7cm	width	Sq-Sq	No
h04	UPVC-SASH-60	h01-X-8	7cm	height	Mater-Sq	No
h05	UPVC-SASH-60	h01-X-8	7cm	height	Mater-Sq	No

■ h03 ina is_variable=YES. Formula = 'X'. POS itamuuliza user aingize X. Baada ya hapo X inakuwa constant kwenye formulas zote.

h04/h05 formula = h01-X-8: total height minus top section minus frame deductions.

Shape	Material	Type	Width Formula	Height Formula	Clear
glass_top	GLASS-5MM	Area	w03-4	h03-4	4mm
glass_L	GLASS-5MM	Area	(w04-2)/2	h04-4	4mm
glass_R	GLASS-5MM	Area	(w05-2)/2	h05-4	4mm

POS: W=120cm x H=180cm x X=45cm

System asks: Variable found (h03=X). Input required: W, H, AND X.

Round 1 — Null + Variable:

Line	Formula	Substitution	Length	+Offcut	Cut Len
w01	null→W	120	120	+10	**130cm**
w02	null→W	120	120	+10	**130cm**
h01	null→H	180	180	+10	**190cm**
h02	null→H	180	180	+10	**190cm**
h03	X (variable)	X=45	45	+7	**52cm**

Round 2 — Dependent:

Line	Formula	Substitution	Length	+Offcut	Cut Len

w03	`w01-6`	120-6=114	114	+7	**121cm**
w04	`w01-6`	114	114	+7	**121cm**
w05	`w01-6`	114	114	+7	**121cm**
h04	`h01-X-8`	180-45-8=127	127	+7	**134cm**
h05	`h01-X-8`	127	127	+7	**134cm**
glass_top	`110x41`	114-4, 45-4	-	N/A	**110x41cm**
glass_L	`56x123`	(114-2)/2, 127-4	-	N/A	**56x123cm**
glass_R	`56x123`	same	-	N/A	**56x123cm**

Cutting List:

Profile/Material	Pieces	Cut Len	Qty	Stock	Bars
UPVC-FRAME-70 (W)	w01,w02,w03	**130,130,121**	3	6.0m	**1 bar**
UPVC-FRAME-70 (H)	h01,h02,h03	**190,190,52**	3	6.0m	**1 bar**
UPVC-SASH-60 (W)	w04,w05	**121cm**	4	6.0m	**1 bar**
UPVC-SASH-60 (H)	h04,h05	**134cm**	4	6.0m	**2 bars**
GLASS-5MM	all 3 panes	**various**	3	300x200	**1 sheet**

MUHTASARI — Kulinganisha Styles Zote

	Casement	Sliding	Fixed	Door	Variable
Type	Window	Window	Fixed	Door	Window
Material	Aluminium	Aluminium	Aluminium	Aluminium	UPVC
Lines	9	10	8	9	10
Shapes	4	2	1	2	3
Variable?	**No**	**No**	**No**	**No**	**Yes(X)**
POS Input	WxH	WxH	WxH	WxH	WxH+X
Sash?	2	2	No	1	2
Mullion?	**Yes**	No	No	No	No
Threshold?	No	No	No	**Yes**	No
Interlock?	No	**Yes**	No	No	No
Fill Types	Glass+Net	Glass	Glass	Glass+Board	Glass

Kanuni Zilizo Sawa Kwa Styles ZOTE:

- **Frame TU** ndio ina formula = null (fallback kwa W au H kulingana na position)
- Lines nyingine **LAZIMA** ziwe na formula inayoreference lines nyingine
- Formulas ni **dependency chain**: null → za null → za hizo → ...
- Material type kwenye line inaambia system **piece ni nini** (frame, sash, mullion, bead, threshold)
- Material group = **filter** — unaona TU materials za style yako
- Offcut inaongezwa **BAADA** ya formula evaluation
- Cutting list inazaliwa tu kwa projects zilizo **In Progress**
- Material quantities kutoka **cut list results** — siyo raw formulas
- Variable (X/Y/Z) inakuwa **constant** baada ya POS input
- Endpoint types (Mater-Mater, Mater-Sq, Sq-Sq) zinaelezea **jinsi profiles zinavyokutana**

"System haimuulizi fundi ahesabu — inamwambia fundi akateje."