

# Cabbirka faylka sawirada dijitaalka

## Computing

**Unit** Matnaajinta xogta: sawir iyo cod



## Natiijo

Waxaan qeexi karaa sida cabbirka faylka sawirka loo xisaabiyo iyo sida isbeddelka tayada sawirka iyo saxnaanta midabka uu tan u beddelo.

# Erayada muhiimka ah

## **xallinta (resolution)**

wadarta guud ee pixels-ka uu sawirku ka kooban yahay, oo ku salaysan ballaca iyo dhererka, oo lagu muujiyey pixels

## **qoto dheerida midabka (colour depth)**

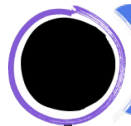
tirada bits-ka loo isticmaalo in lagu matalo midabka pixel kasta, oo sidoo kale loo yaqaan bit depth

## **cabbirka faylka (file size)**

qiyaasta xogta binary-ga ah ee faylku ka kooban yahay

## Qaabka casharka

Cabbirka faylka sawirada dijitaalka



Xisaabinta cabbirka faylka sawirka



Saamaynta isticmaalka xallinta (resolution) kala duwan



Saamaynta isticmaalka qoto dheerida midabka (colour depth) kala duwan

Sawirka dijitaalku wuxuu ka kooban yahay walxo gaar ah, oo loo habeeyey shabag leydi ah.

Walxaha sawirka dijitaalka waxaa loo yaqaan pixels.

Tirada pixels-ka ee sawirka dijitaalku waa xallinta (resolution) sawirka.



# Xisaabinta cabbirka faylka sawirka

**xallinta (resolution) (pixels) = ballaca (pixels) × dhererka (pixels)**

ballaci = 720 pixels

jooggi = 720 pixels

**Xallinta (Resolution):**

$720 \times 720 = 518\,400$  pixels

720  
pixels



720  
pixels

Xisaabi xallinta (resolution) sawirkan.

**a**

112 pixels



ballaci = 8 pixels  
jooggi = 14 pixels

**Xallinta (Resolution):**

$8 \times 14 =$   
112 pixels

**b**

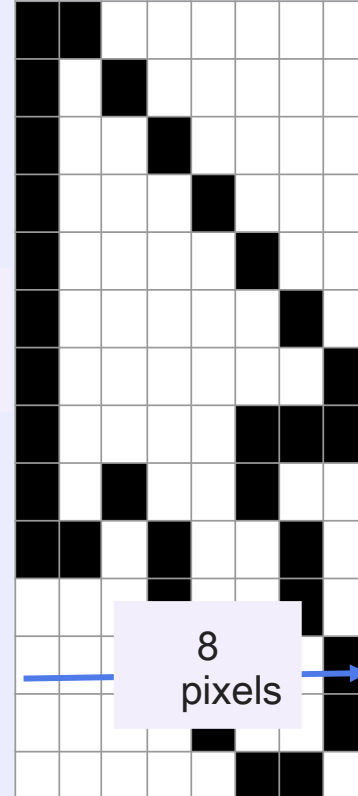
22 pixels

**c**

100 pixels

14  
pixels

8  
pixels



Si loo xisaabiyo tirada bits-ka ee sawirka isticmaalaya 2 bits per pixel:

Waxaa jira  $10 \times 10 = 100$  pixels (curiyayaasha sawirka).

2 bits ayaa loo isticmaalaa midabka pixel kasta.

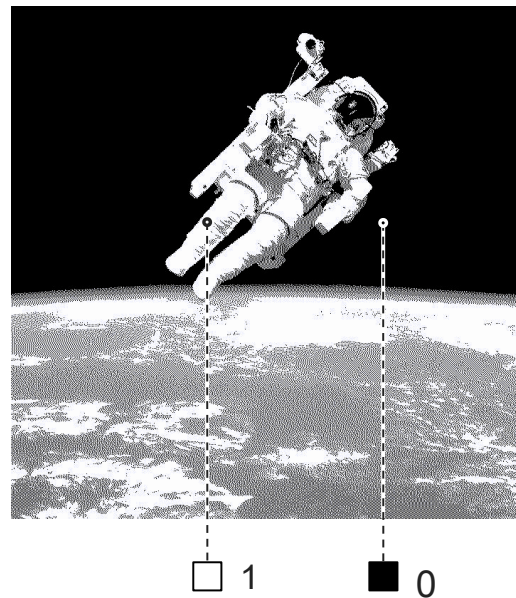
Tirada guud ee nambarada binary (binary digits) ee sawirka:  
 $100 \text{ pixels} \times 2 \text{ bits per pixel} = 200 \text{ bits}$ .

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 11 | 11 |
| 00 | 00 | 00 | 00 | 00 | 00 | 00 | 10 | 01 | 11 |
| 00 | 00 | 00 | 00 | 00 | 00 | 10 | 10 | 10 | 00 |
| 00 | 00 | 00 | 00 | 00 | 10 | 10 | 10 | 00 | 00 |
| 00 | 00 | 00 | 00 | 10 | 10 | 10 | 00 | 00 | 00 |
| 00 | 00 | 00 | 10 | 10 | 10 | 00 | 00 | 00 | 00 |
| 00 | 00 | 10 | 10 | 10 | 00 | 00 | 00 | 00 | 00 |
| 00 | 01 | 10 | 10 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00 | 01 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 11 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

Pixel kasta, tixgal ah xuruuf binary ayaa loo isticmaalaa in lagu muujiyo midabkiisa.

Tirada xuruufaha binary ee loo isticmaalo midabka pixel kasta waa qoto-dheerka midabka (colour depth).

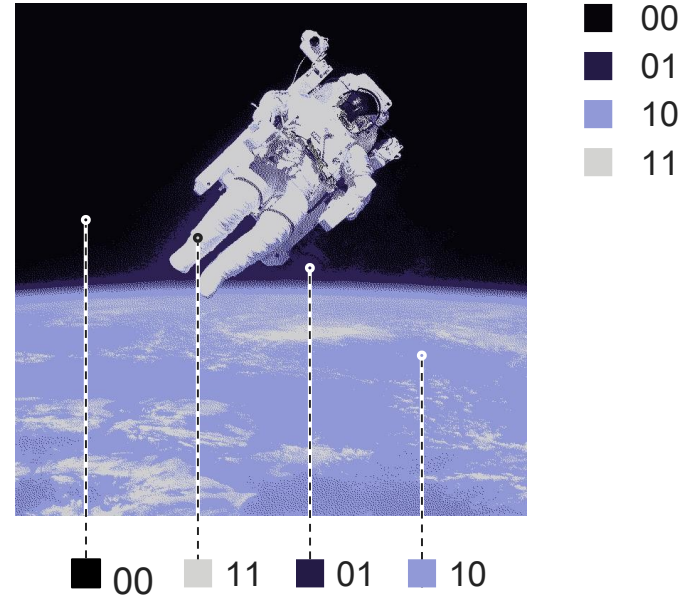
**Qaraarka (Resolution):  $720 \times 720 = 518\,400$  pixels**  
**Qoto-dheerka midabka: 1 bit (2 midab oo suurtagal)**



Pixel kasta, tixgal ah xuruuf binary ayaa loo isticmaalaa in lagu muujiyo midabkiisa.

Tirada xuruufaha binary ee loo isticmaalo midabka pixel kasta waa qoto-dheerka midabka (colour depth).

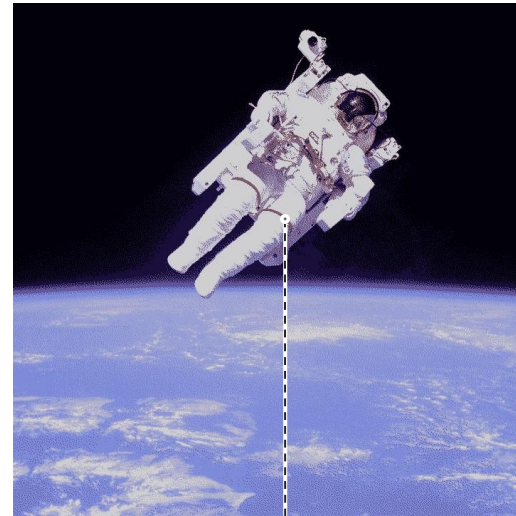
**Qaraarka (Resolution):  $720 \times 720 = 518\,400$  pixels**  
**Qoto-dheerka midabka: 2 bits (4 midab oo suurtagal)**



Pixel kasta, tixgal ah xuruuf binary ayaa loo isticmaalaa in lagu muujiyo midabkiisa.

Tirada xuruufaha binary ee loo isticmaalo midabka pixel kasta waa qoto-dheerka midabka (colour depth).

**Qaraarka (Resolution):  $720 \times 720 = 518\,400$  pixels**  
**Qoto-dheerka midabka: 3 bits (8 midab oo suurtagal)**



|                                                                                     |     |
|-------------------------------------------------------------------------------------|-----|
|  | 000 |
|  | 001 |
|  | 010 |
|  | 011 |
|  | 100 |
|  | 101 |
|  | 110 |
|  | 111 |

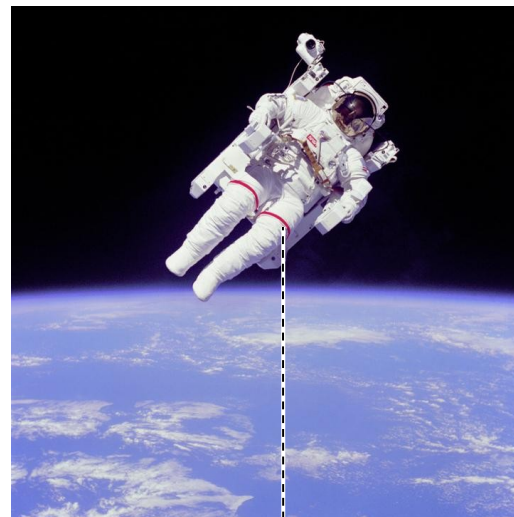
 011

Pixel kasta, tixgal ah xuruuf binary ayaa loo isticmaalaa in lagu muujiyo midabkiisa.

Tirada xuruufaha binary ee loo isticmaalo midabka pixel kasta waa qoto-dheerka midabka (colour depth).

**Qaraarka (Resolution):  $720 \times 720 = 518\,400$  pixels**  
**Qoto-dheerka midabka: 24 bits**

Qiimaha caadiga ah ee qoto-dheerka midabka waa 24 ama 32 xuruuf binary pixel kasta.



110001000001101101010110

Maxay qoto-dheerida midabka (colour depth) sawirku sharxaysaa?

- a** joogga sawirka ee pixels
- b** tirada midabbada kala duwan ee uu muujin karo



- c** tirada midabbada kala duwan (sida cas, cagaar iyo buluug) ee lagu daray pixel kasta

Si loo xisaabiyo cabbirka faylka sawirka:

**cabbirka faylka (bits) = ballaca (pixels) × joogga (pixels) × qoto-dheerida midabka (bits)**

**Cabbirka faylka:**

$720 \text{ pixels} \times 720 \text{ pixels} \times 24 \text{ bits} = 12\,441\,600 \text{ bits}$



12 441 600 bits — taasi waa tiro aad u badan! Ma jirtaa hab loogu beddelo cutubyo kale si ay u fududaato fahamka?



Waxaa jira cutubyo badan oo caadi ah oo kaydinta dhijitaalka ah: Saciid

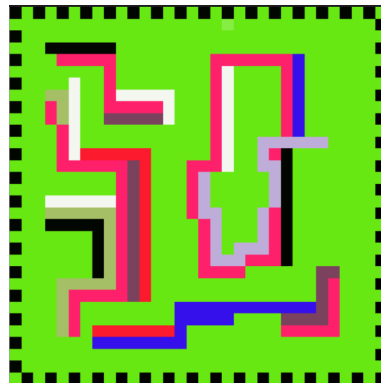
8 bits oo ku jira byte:  $12\,441\,600 \div 8 = 1\,555\,200$  bytes

1000 bytes oo ku jira kilobyte (kB):  $1\,555\,200 \text{ bytes} \div 1000 = 1555 \text{ kB}$

1000 kilobytes oo ku jira megabyte (MB):  $1555 \text{ kB} \div 1000 = 1.55 \text{ MB}$

- 1) Saciid wuxuu sameeyay logo (logo) ciyaar. Logogu waa sawir bitmap (bitmap image) ah  $3000 \times 3000$  pixels. Waa maxay xallinta (resolution) logoga?
- 2) Saciid wuxuu kaloo sameeyay astaan (icon) ciyaarta xallinta shabagga (maze solving game) uu abuuray. Astaantu waa 32 pixels ballac iyo 32 pixels joog.

Imisa pixels ayuu sawirku wadar ahaan leeyahay?



- 3) Ciyaarta Saciid, waxaa jira jilaa (character) ah 32 pixels joog iyo 16 pixels ballac. Console-ka ciyaartu wuxuu matali karaa 64 midab, oo lagu matalo 6 bits pixel kasta. Waa maxay cabbirka faylka jilaaga ee bytes?

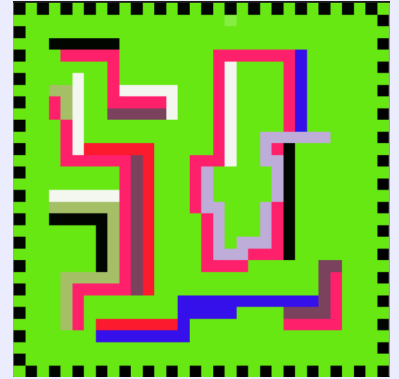
- 1) Saciid wuxuu sameeyay astaan (logo) ciyaar. Astaantu waa sawir bitmap ah oo  $3000 \times 3000$  pixels. Waa maxay xallinta (resolution) astaanta?

$$3000 \text{ pixels} \times 3000 \text{ pixels} = 9\,000\,000 \text{ pixels}$$

2. Saciid wuxuu kaloo sameeyay astaan (icon) ciyaarta maze ee uu sameeyay. Waa 32 pixels ballac iyo 32 pixels joog.

Imisa pixels ayuu wadarta guud u leeyahay sawirku?

$$32 \text{ pixels} \times 32 \text{ pixels} = 1024 \text{ pixels}$$



3) Ciyaarta Saciid, waxaa jira jilaa (character) 32 pixels joog ah iyo 16 pixels ballac ah. Console-ka ciyaartu wuxuu matali karaa 64 midab, oo lagu matalo 6 bits pixel kasta. Waa maxay cabbirka faylka jilaaga ee bytes?

**Xallinta (Resolution):**

$32 \times 16 = 512$  pixels

Wadarta bits:

$512 \text{ pixels (xallin)} \times 6 \text{ bits (qoto midab)} = 3072 \text{ bits}$

U beddel bits-ka bytes:

$3072 \text{ bits} \div 8 = 384 \text{ bytes}$

## Qaabka casharka

Cabbirka faylka sawirrada dijitaalka ah



Xisaabinta cabbirka faylka sawirka



Saamaynta isticmaalka xallinno (resolutions) kala duwan

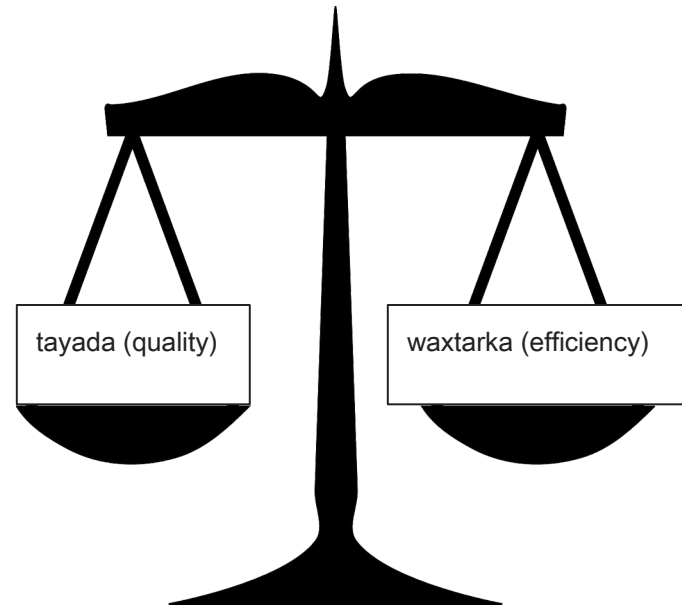


Saamaynta isticmaalka qotooyin midab (colour depths) kala duwan

Marka la dooranayo cabbirka resolution-ka sawirka, waxaa jira dheellitir u dhexeeya tayada (quality) iyo waxtarka (efficiency).

Tayadu waxay loola jeedaa caddaynta iyo faahfaahinta sawirka.

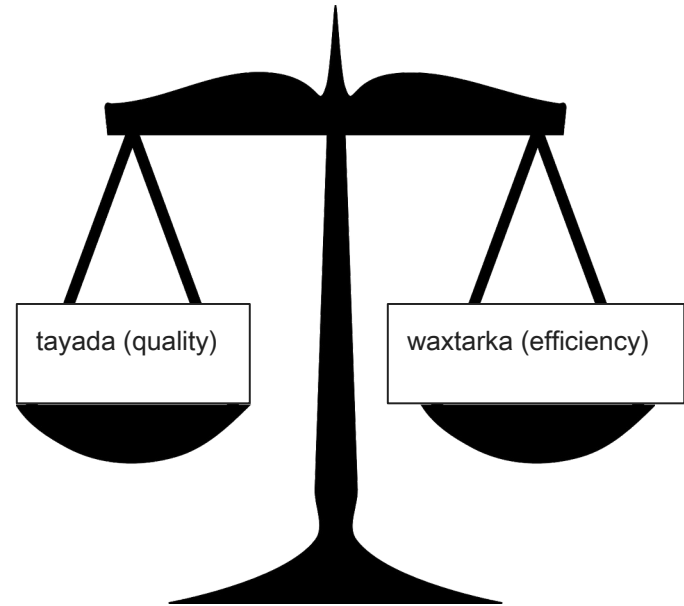
Sawirada tayadoodu sareyso waa kuwa cad oo leh faahfaahin fiican.



Marka la dooranayo cabbirka resolution-ka sawirka, waxaa jira dheellitir u dhexeeya tayada (quality) iyo waxtarka (efficiency).

Waxtar (Efficiency) macneheedu waa in wax si fiican loo qabto iyada oo aan laga lumiya kheyraadka sida booska kaydinta, xawaaraha internetka ama awooda kombiyuutarka.

Tusaale ahaan, sawirada waxtarka leh waa la beddelaa oo wanaajiyaa si loo hubiyo inay u muuqdaan kuwo wanaagsan iyada oo aan la isticmaalin boos badan ama aan la gaabin.



Sababta resolution-ka muhiim u yahay:

- ciyaaraha (gaming) iyo naqshadaynta garaafyada (graphic design), resolution-ku wuxuu saameeyaa sida dhabta ah ee ciyaartu u egtahay
- sawir qaadista (photography), resolution-ka sare wuxuu ka dhigaa sawirada kuwo faahfaahsan
- daawashada (streaming) ama isticmaalka shabakadda (web), doorashada resolution-ka saxda ah waxay dheellitirtaa tayada (quality) iyo wixtarka (efficiency)

Waa maxay faa'iidada ugu weyn ee isticmaalka resolution-ka sare ee sawirka?

**a**

sawirku wuxuu isticmaali doonaa boos kaydin yar

**b**

sawirku wuxuu u muuqan doonaa mid cad oo faahfaahsan



**c**

sawirku wuxuu ku soo degan doonaa si dhakhso leh bogga shabakadda



Saciid

Shaqada dugsigayga, ma eego xallinta (resolution) sawirada aan isticmaalo.

Waxaan samaynayay soo bandhig (presentation) markii aan weyneeyay sawirka wuxuu noqday mid aan caddayn, sidaas darteed waxaan raadiyay sawir leh xallin (resolution) sare.



Suad

Sawirkani waa 2560 pixels × 2027 pixels = 5 189 120 pixels.



Sawirkani waa 1280 pixels  $\times$  1014 pixels = 1 297 920 pixels.



Sawirkani waa 970 pixels  $\times$  768 pixels = 744 960 pixels.



Sawirkani waa 757 pixels  $\times$  599 pixels = 453 443 pixels.



Sawirkani waa 606 pixels  $\times$  480 pixels = 290 880 pixels.

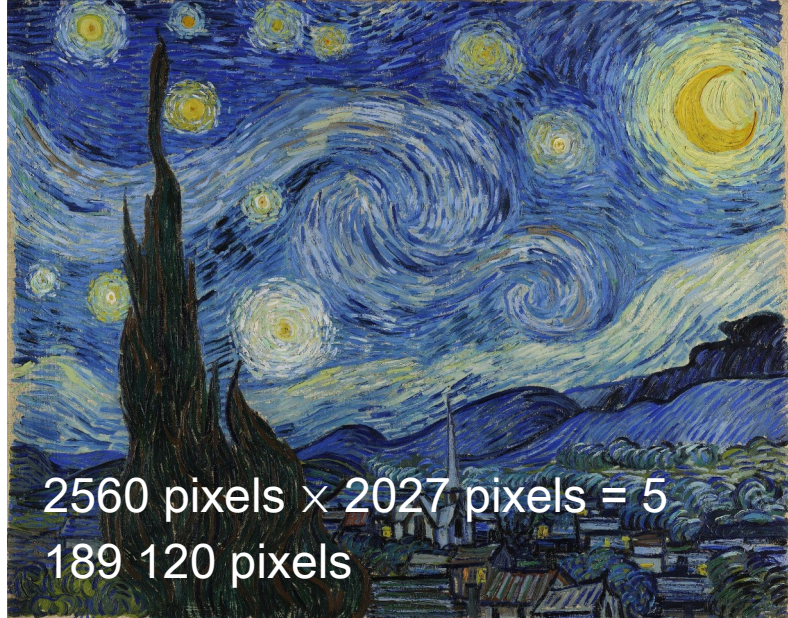


Sawirkani waa 250 pixels  $\times$  198 pixels = 49 500 pixels.



Sawirkani waa 100 pixels  $\times$  79 pixels = 7900 pixels.





## Tayada muuqaalka (Visual quality)

Xallinta sare (Higher resolution) waxay wanaajisaa faahfaahinta, gaar ahaan shaashadaha waaweyn.

Sawirada xallinta hoose (low resolution) waxay u ekaan karaan kuwo pixelaysan ama faahfaahin la'aan marka la weyneeyo ama lagu muujiyo kormeerayaasha qeexida sare (high definition).

## Cabbirka faylka (File size)

Sawirada xallinta sare (higher resolution) waxay leeyihiin cabbirro fayl oo ka waaweyn sababtoo ah waxay kaydiyaan pixels badan.

Sawirada xallinta hoose (lower resolution) waxay qaataan kayd in yar laakiin tayadoodu hooseysaa.

## Tusaalooyin

Sawirada xallinta sare (High resolution) waxay ku habboon yihiin daabacaadda, sawir qaadista xirfadda leh iyo shaashadaha waaweyn.

Sawirada xallinta hoose (Low resolution) waxay ku habboon yihiin isticmaalka shabakadda, wakhtiyada soo dejinta degdega ah iyo aaladaha leh shaashado yaryar.

Suad waxay rabtaa in shabakadeedu si degdeg ah u soo dejiyo. Xallinta sawir ee kee ayay dooranaysaa Suad si ay u hubiso wakhtiyada soo dejinta degdega ah iyadoo ilaalinaysa tayo wanaagsan?

**a**

xallinta sare (high resolution), oo inta badan keenta wakhti soo dejinta gaabis ah

**b**

xallinta hoose (low resolution), oo laga yaabo inay si degdeg ah u soo dejiso laakiin waxay dhimaysaa tayada sawirka

**c**

xallinta la hagaajiyay (optimised resolution), oo isu dheellitirta tayada iyo xawaaraha soo dejinta



1. Suad waxay u direysaa sawir oo lifaaqan emayl Saciid. Maxaa sabab u noqon kara in Suad u doorato inay u dirto nooca xallinta hoose (low resolution) ee sawirka halkii ay u diri lahayd nooca asalka ah ee xallinta sare (high resolution)?
2. Saciid waxuu daabacanayaa sawir weyn si uu ugu dhejiyo gurigiisa. Miyuu Saciid dooranayaa sawir xallintiisu sareeyso (high resolution) ama mid hoose (low resolution)? Sharax jawaabtaada.

3. Suad waxaa laga codsaday inay naqshadeeyso sawir lagu dhiirrigelinayo qaab nololeed caafimaad leh oo lagu soo bandhigi doono billboard dhijitaal ah oo ku yaal xarunta magaalada. Waa maxay arrimaha aad tixgelin lahayd markaad dooranayso xallinta sawirada billboard-ka? Sharax sababtaada.

1. Suad waxay u direysaa sawir oo lifaaqan emayl Saciid. Maxaa sabab u noqon kara in Suad u doorato inay u dirto nooca xallinta hoose (low resolution) ee sawirka halkii ay u diri lahayd nooca asalka ah ee xallinta sare (high resolution)?

Dirista sawir xallintiisu hooseyso (low resolution) emayl ayaa ka fiican sababtoo ah waxay yeelan doontaa cabbir fayl oo yar. Tani waxay ka dhigan tahay inay si degdeg ah u diri doonto oo ay u yar tahay inay keento dhibaatooyin xadka cabbirka emaylka. Inkasta oo tayadu laga yaabo inay u fiicnayn sida asalka ah, haddana waxay weli fiicnaan doontaa daawashada taleefanka ama shaashadda kombiyuutarka.

2. Saciid wuxuu daabacayaa sawir weyn si uu ugu dhejiyo gurigiisa. Saciid waa inuu doortaa sawir xallintiisu sarreyso (high resolution) ama hooseyso (low resolution)? Sharax jawaabtaada.

Saciid waa inuu doortaa sawir xallintiisu sarreyso (high resolution) marka uu daabacayo sawir. Sawirrada xallintoodu sarreyso waxay leeyihiin pixels badan, taas oo macnaheedu yahay in sawirka lagu daabici doono faahfaahin iyo caddayn badan. Sawir xallintiisu hooseyso (low resolution) wuxuu u ekaan karaa mid aan caddayn ama pixels leh marka lagu daabaco cabbir weyn.

3. Waa maxay arrimaha aad tixgelin lahayd markaad dooranayso xallinta sawirrada loogu talagalay billboard-ka?

Waxaan dooran lahaa xallin sare (high resolution). Billboard-yadu waa kuwo aad u weyn, sidaas darteed sawirradu waxay u baahan yihiin pixels badan si ay u ekaadaan kuwo cad oo qurux badan marka laga eego meel fog. Billboard-yada waxaa laga eegaa meel fog, sidaas darteed tayada sawirka ayaa mudnaan leh marka loo eego cabbirka faylka.

Si kastaba ha ahaatee, waxaan sidoo kale u baahanahay inaan tixgeliyo awoodda shaashadda (display screen) iyo kaydinta nidaamka kombuyuutarka ee billboard-ka. Waxaa jiri kara xad ku saabsan sida sare ee xallintu noqon karto.

Cabbirka faylka sawirrada dijitaalka ah



Xisaabinta cabbirka faylka sawirka



Saamaynta isticmaalka xallinta sawirka ee kala duwan



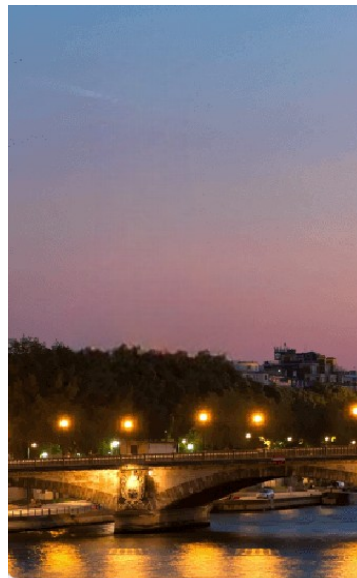
Saamaynta isticmaalka qoto-dheerka midabka ee kala duwan

## **Qoto-dheerka midabka (colour depth) waxaa loola jeedaa tirada bits-ka**

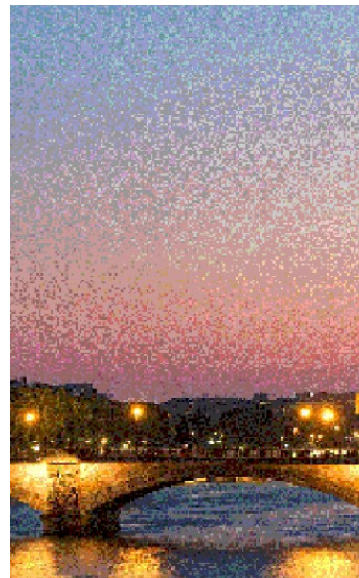
loo isticmaalo in lagu matalo midabka hal pixel oo ku jira sawir ama shaashad.

Qoto-dheerka midabka sare wuxuu u oggolaanayaa midabyo badan, taasoo keenta gradient jilicsan iyo sawirro dhab ah.

Sawirkan waxaa loo qaybiyay laba qaybood. Qayb kastaa waxay leedahay qoto-dheer midab oo kala duwan.



24 bit midab  
16.7 milyan oo midab



8 bit midab  
256 midab

## **Qoto-dheer midab (colour depth) waxaa badanaa loo dejiyaa mid ka mid ah:**

8 bit: 256 midab (loo isticmaalo nidaamyada hore)

16 bit: 65,536 midab (midab sare, loo isticmaalo multimedia-ga hore)

24 bit: 16.7 milyan midab (midab run ah, heerka sawirada iyo bandhigyada casriga ah)

Nolosha dhabta ah, waxaan dareemi karnaa kala duwanaansho midab oo aad u badan. Sidaa darteed, inta badan midabka aad ku isticmaasho sawirka, waa sida uu sawirku u ekaan doono xaqiiqda.

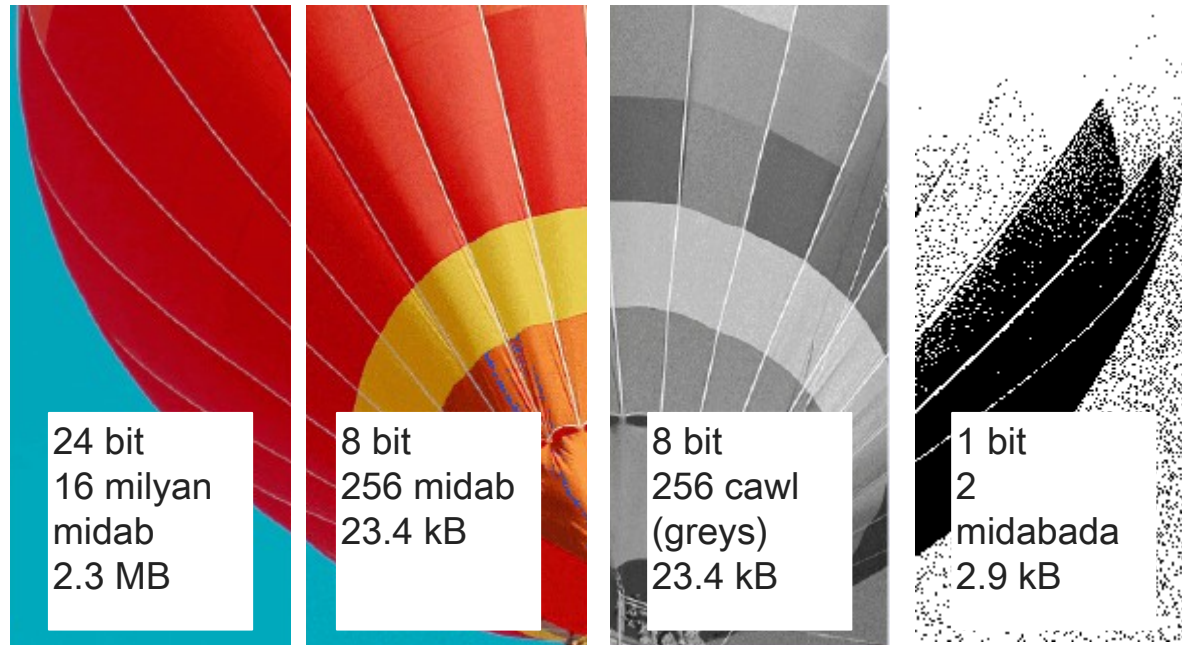
Qoto-dheer midab sare wuxuu keenaa midab qani ah oo sax ah.



Si kastaba ha ahaatee, bits badan oo pixel kii ah waxay ka dhigan yihiin cabbir fayl oo weyn, sababtoo ah pixel kasta wuxuu u baahan yahay xog badan si loo kaydiyo macluumaadka midabkiisa.



Waxaad arki kartaa sida cabbirka faylku u yaraado marka qoto-dheer midabka la dhimo.



Sababta aad u dooran karto inaad yarayso qoto-dheer midabka waa inaad yarayso cabbirka faylka.

Marka la isticmaalo bits badan oo midabada sawirka lagu matalo, waxaa loo baahan yahay meel kaydin ah oo badan si loo kaydiyo sawirkaas.

Dirista sawirro cabbirkiisu yar yahay iyadoo loo marayo fariimaha taleefanka gacanta waxay u oggolaanaysaa in si dhakhso ah loo helo waxayna yaraynaysaa isticmaalka xogta (data) ee diraha.

Tusaale:

8 bits: garaafyo fudud, astaamo (icons), ciyaaraha qaabka retro

16 bits: multimedia aasaasi ah, ciyaaraha duugga ah

24 bits/32 bits: sawir qaadis (photography), tafatirka fiidiyowga iyo shaashado tayo sare leh

Saciid wuxuu abuurayaa sawir si uu ugu xayeysiyo munaasabadda samafalka ee dugsigeeda. Waxay haysaa laba nooc oo isku sawir ah.

sawirka A

414 948 midab  
oo kala duwan

sawirka B

256 midab oo  
kala duwan

- 1) Sawir kee ayaa yeelan doona cabbirka faylka ugu yar? Sabab?

- 2) Haddii Saciid rabo inuu isticmaalo sawirka website-ka dugsiga, sawir kee ayaa ku habboon? Sabab?
- 2) Sawir kee ayaa ugu fiican daabacaadda banner weyn oo tayo sare leh oo lagu soo bandhigi doono albaabada dugsiga? Sabab?

**Sawirka A**

414 948  
midabyo kala  
duwan

**Sawirka B**

256 midabyo  
kala duwan

- 1) Sawirkaas ayaa yeelan doona xajmiga ugu yar (file size)? Sababta.

Sawirka B ayaa yeelan doona xajmiga ugu yar (file size). Tiro hoose oo midabyo ah waxay ka dhigan tahay qoto-dheer midab oo hooseeya (colour depth), taasoo macneheedu yahay in sawirku qaato meel kayd ah oo yar.

- 2) Haddii Saciid uu rabo inuu sawirka isticmaalo website-ka dugsiga, sawirkaas ayaa ku habboon? Sababta?

Sawirka B ayaa ku habboon website-ka. Xajmiyada yar (file sizes) ayaa muhiim u ah websites-ka si ay si degdeg ah u soo galaan. Sawir leh qoto-dheer midab oo sarreeya (high colour depth) wuxuu sababi karaa in bogga website-ku si gaabis ah u soo galo.

- 3) Sawirkaas ayaa ugu wanaagsan daabacaadda banner weyn oo tayo sare leh (high-quality) oo la dhejin doono albaabka dugsiga? Sababta?

Sawirka A (qoto-dheer midab oo sarreeya) ayaa ugu wanaagsan banner-ka. Sawirrada leh qoto-dheer midab oo sarreeya waxay leeyihiin faahfaahin dheeri ah waxayna u ekaan doonaan kuwo cad marka la daabaco cabbir weyn.

**Xallinta (Resolution) waxaa loola jeedaa tirada pixels ee sawirka ku jira.**

Xallin sare (Higher resolution) waxay ka dhigan tahay pixels badan iyo sawir faahfaahsan.

**Qoto-dheer midab (Colour depth) waxaa loola jeedaa tirada bits ee loo isticmaalo in lagu muujiyo midabka pixel kasta. Qoto-dheer midab oo sarreeya (Higher colour depth) waxay ka dhigan tahay kala duwanaansho midab oo ballaadhan.**

Waxaa jira is-dheelli-tir u dhexeeya tayada sawirka iyo xajmiga. Sawirrada tayada sare leh (pixels badan, midabyo badan) badanaa waxay leeyihiin xajmiyo weyn (file sizes).