(10)

P2, #1(c) For Dirichlet Boundary Condition, we take odd continuation of h to $x<0$:

$$H(x) = \begin{cases} x & x>0 \\ 0 & x=0 \\ x & x<0 \end{cases}$$

Similarly

① For $x>2t$, $u(x,t) = \frac{1}{4}\int_{x-2t}^{x+2t} H(y)\,dy$

$$= \frac{1}{4}\int_{x-2t}^{x+2t} y\,dy$$

$$= \frac{1}{4}\cdot\frac{1}{2}\left[(x+2t)^2-(x-2t)^2\right]$$

$$= xt$$

② For $0<x<2t$, $u(x,t) = \frac{1}{4}\int_{x-2t}^{x+2t} H(y)\,dy$

$$= \frac{1}{4}\int_{0}^{x+2t} H(y)\,dy + \frac{1}{4}\int_{x-2t}^{0} H(y)\,dy$$

$$= \frac{1}{4}\int_{0}^{x+2t} y\,dy + \frac{1}{4}\int_{x-2t}^{0} y\,dy$$

$$= \frac{1}{8}(x+2t)^2 + \frac{1}{8}(x-2t)^2$$

$$= xt$$

$\Rightarrow$ general sol:

$$u(x,t) = \begin{cases} xt & x>2t \\ xt & 0<x<2t \end{cases}$$